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# USSR Report

CONSTRUCTION AND RELATED INDUSTRIES

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23 May 1985

## USSR REPORT

### CONSTRUCTION AND RELATED INDUSTRIES

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GOSSTROY OFFICIAL ON NEW GUIDELINES FOR COST ESTIMATION

Moscow SOVETSKAYA ROSSIYA in Russian 1 Feb 85 p 1

[Article by V. Stolyarov: "Design Authority"]

[Text] As has already been reported, at a recent session the Politburo of the CPSU Central Committee reviewed and approved proposals by the USSR Council of Ministers concerning the further improvement of design and estimate affairs and increasing the role of expert advice and author oversight in construction. I. Ishchenko, deputy chairman of USSR Gosstroy, comments on the proposed measures at the request of the editorial board.

"As is generally known, construction begins with the design. A high-quality design that is issued to the contractor organization in a timely fashion sets the tempo and determines the quality of the projects under construction. But applying the most advanced developments in the design that correspond to the newest achievements in domestic and foreign science and technology is especially important. Frankly speaking, not everything is satisfactory with us in this area. Now, the use of outmoded technological processes and equipment is prohibited. The all-union and departmental norms for technological and structural design work will be reviewed this year which will make it possible to improve the technical standard of design work. Measures are being taken that will more closely tie in the plans of designers with the plans of clients and machine builders in order to accelerate the adoption of advanced technology and equipment that have a long manufacturing cycle. We intend to increase the incentive for design organizations to reconstruct and technically retool enterprises. Designers will now be able to obtain a bonus of up to 50 percent of the cost for the difficult nature of design and research work under operating production conditions. Allocations to economic incentive funds and the size of worker bonuses will be correspondingly increased.

"At the same time measures are being outlined to increase the incentive for designers to reduce the estimated cost of construction. The conditions for forming a material incentive fund are being changed. Additional allocations in the amount of up to 15 percent of the cost of the work will be made for high-quality work in developing a technical and economic foundation for construction as well as for the design itself. It will also become advantageous to economize on resources during the developmental stage of the working documentation. If the sum in the working documents proves to be less

than in the approved design then the client will be obliged to transfer up to 20 percent of the savings obtained to the design organization.

"The methodology for determining the value of the design work is being revised. The existing system of determining it based on the cost of the construction and installation work is clearly outmoded. Therefore, beginning next year, a new method will be adopted that will make it possible to tie the cost of the design and research work more closely to such technical indicators as the power, duration, capacity and area of the future project.

"Increasing the role of the chief engineers (chief architects) for the design, who will bear a large responsibility for the technical and economic level and the architectural approach to the projects under construction, has important significance for regulating design and estimate affairs. During design work for the most important projects it is permissible to set up the position of deputy chief engineer for the design, thanks to whom greater possibilities for creative work will become available for the supervisor. The incentive for design organization collectives to complete assignments with the least number of workers is increasing. The wages that are saved in this manner will become the source for bonuses above the official salaries in sums amounting to 30 to 50 percent. In addition, bonuses will be paid from the economizing fund for combining professions and positions. With the aim of increasing the number of qualified personnel, one-time bonus payments will be made based on the number of years of service to workers in design and research organizations beginning in 1986.

"The measures being taken that are intended to improve work efficiency in the design experts' agencies as well as to increasing author oversight of the fulfillment of the design requirements has important significance. The USSR Council of Ministers has committed union ministries and departments and union republic councils of ministers to upgrade their expert subdivisions with qualified personnel after having placed them directly under jurisdiction of department supervisors or their first deputies. Author oversight imparts the right to stop construction and installation work at projects if violations of design requirements and standards are discovered."

9495

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GOSSTROY OFFICIAL ON CAPITAL CONSTRUCTION PLAN

Moscow PRAVDA in Russian 2 Jan 85 p 2

[Article: "USSR in Construction"]

[Text] At the request of a PRAVDA correspondent, USSR Gosstroy Chairman S. V. Bashilov tells of the current program of capital construction and of ways for better implementing it.

First of all, I would like to draw the attention of the readers to the following. Positive shifts have been noted in construction in the past 2 years. The operational introduction of fixed capital is growing at an increased rate as compared with the growth of capital investments, the level of unfinished work has been reduced, and the volumes of technical retooling and reconstruction of existing enterprises have been increased. Labor productivity has started to increase at a faster rate. These and other positive tendencies have been fixed and developed in the program for the coming year.

Particular attention has been given to accelerated returns on capital investments, whose volume from all sources of financing is planned in the sum of 175.1 billion rubles. State capital investments, including those for installation operations, are increasing by 5.5 percent, while the operational introduction of fixed capital is increasing by 7.6 percent. This means that facilities will be submitted for operation sooner and that the invested funds and resources will be pay for themselves faster. The pre-schedule operational introduction of fixed capital will make it possible to reduce unfinished construction even more and to bring it down to values close to the standard.

The scope of reconstruction and technical retooling of existing enterprises is growing significantly. There have been 30.5 billion rubles in capital investments allocated for these purposes, which is 9.3 percent greater than last year. Renovation of work stations is the most effective means of utilizing capital investments and reducing the times for return on capital, as well as accelerating scientific-technical progress.

Previously the contracting organizations were not sufficiently interested in performing this work. After all, it is more complicated to work under the cramped conditions of existing production than to erect new buildings on an

open site. Yet the payments received were about equal. Now the managers of the customer enterprises, construction and project planning organizations have been given the right to perform work associated with reconstruction and technical retooling in accordance with coordinated estimates and with consideration of the real conditions and the character of the work.

The sectors within the fuel-energy complex will develop at a leading pace. This complex has been and remains the motivating force of the economy. The overall increase in electrical power in the current year will comprise 55 billion kilowatt-hours. Over one-half of this will be obtained at atomic power stations. In the current year, energy units with capacity of a million kilowatts each will go into operation at the Smolensk, Balakovo, Kursk, and Zaporozhye AES [atomic power stations].

The beginning of energy assimilation of the unique coal deposits in the Kansk-Achinsk Territorial Production Complex will be the start-up of the power unit at the Berezovo GRES-1 [State Regional Electrical Power Station], which will become the first in a family of such giants. The first stage in the formulation of the South Yakutsk TPK [territorial production complex] will be basically completed, where the Neryungri Open Pit Coal Mine and GRES will become operational to their full capacity.

The hydraulic resources of rivers are being actively involved in the cause. New turbines at the Sayano-Shushensk, Maynskiy, Baypazi, Tashkumyr and Zhinvali GES [hydroelectrical power stations] will produce power. The Ekibastuz-Chelyabinsk alternating current 1.150 kV electrical transmission lines and a number of others will be introduced into operation.

The country will realize its entire growth in the extraction of petroleum and gas by increasing their extraction in Western Siberia. Therefore, the accelerated construction of large pipelines is primarily envisioned for transporting oil and gas from these regions. The second phase of the Urengoy-Tsentral gas pipeline will go into operation, as well as the Urengoy-Surgut condensate pipeline.

The volumes of capital operations in the coal industry will increase. The Vostochnyy Open Pit Mine will go into operation in Pavlodar Oblast, with a capacity of 15 million tons of coal a year. The first phase of the Berezovskiy Open Pit Mine in Krasnoyarskiy Kray and the Pavlovskiy Open Pit Mine No 1 in Primorskiy Kray will also become operations. Many enterprises will be reconstructed.

Metallurgists have been called upon to expand the production of effective types of rolled stock. The capacities for output of sheet metal will be increased at the Novolipetsk Combine and at the Zhdanov Plant imeni Il'yich, as will capacities for the production of tin plate for the canning industry in Karaganda. The Far Eastern Conversion Plant in Komsomolsk-on-Amur will become operational. Machines for continuous ingot casting will be installed at a number of the presently operating shops.

The decisive role in technical retooling of the sectors belongs to machine building. There are plans to develop capacities for the manufacture of 1,000



metal-cutting machine tools in Alma-Ata, "Sibiryak" grain harvesting combines in Krasnoyarsk, automobiles with trailers for agricultural use in Kutaisi, 1,300 industrial robots at the Moscow "Krasnyy Proletariy" [Red Proletariat] Plant, and facilities in many other cities. The successful resolution of these tasks requires the creative cooperation of builders, installers, designers, customers, and manufacturers of equipment, structures and materials.

The introduction of new capacities and the reconstruction of existing ones in the chemical and petrochemical industries will facilitate the acceleration of scientific-technical progress. The contribution of chemists to the resolution of the Food Program is also important. The production of the mineral fertilizers industry will increase by more than 5 million tons annually.

On the whole, almost one-third of all capital investments has been allocated for the development of sectors within the agro-industrial complex. The overall area of reclaimed crop lands will comprise around 35 million hectares by the end of the year. All this, with consideration of construction of facilities for storing and processing agricultural products, animal raising complexes and farms, poultry factories, and hothouse combines, will make it possible to improve the provision of food products to the workers.

The intensification of social division of labor and the expansion of economic ties make the development and improvement of the country's transport system, especially its railroads, a most important task. The railroad network will undergo further development thanks to the operational introduction of around 700 kilometers of secondary lines and the electrification of 1,500 kilometers of lines. There will be 1,300 kilometers of new railroads submitted for operation.

Of course, it is impossible to characterize the development of all the sectors of the economy in a short report. I would like to particularly note, however, that the center of the plan for economic and social development of the country for 1985, as before, is the concern for the Soviet man and for his well-being. Here is but one figure. Residential housing with total area of 114 million square meters will be built at the expense of all sources of financing. This is almost 11 million square meters more than outlined in the five-year plan. However, it is not only the quantity that is important. Particular attention must also be given to improving the quality of residential-civil facilities. For this purpose, it will be necessary to renovate at a faster rate the enterprises for large-panel house building, to accelerate the transition of housing construction to progressive series of houses, and to eliminate those shortcomings about which workers rightfully complained in their letter entitled "A Word About the Honor of the Builder," published in PRAVDA on 8 September 1984.

The tasks for the final year of the five-year plan are based on a sound economic foundation. They are intensive, but realistic. The party is presenting the following task: the plan must be unconditionally fulfilled, and overfulfilled wherever possible and necessary.

In order for the labor collectives to take on a fast rhythm from the very first days, the construction ministries must concentrate the necessary material-

technical and labor resources at the construction sites. Comprehensive schedules for work fulfillment and supply of equipment and materials must be ratified for each start-up facility. It is necessary to increase the importance of projects for organization of construction and work production and to provide in them industrial and highly productive methods of fulfilling the operations. Construction work cannot be conducted without such well thought-out documents.

The improvement of matters will undoubtedly be facilitated by the implementation of the full volume of measures outlined in the resolution by the CPSU Central Committee and the USSR Council of Ministers entitled "On Improving Planning, Organization and Management of Capital Construction," as well as by the realization of the proposals submitted by comrade K. U. Chernenko on questions associated with strengthening the material-technical base and continued industrialization of construction.

It is necessary to more quickly develop and ratify general and departmental schemes of construction management, to liquidate multi-stage organization and parallelism, and to bring the entire system of management closer to production. We also cannot put off intensifying the role of the trusts, who are called upon in deed to become the main segment in management of building production. This will have a positive effect on the entire formulation of the matter, including the introduction of an open brigade order, will accelerate the introduction of capacities, and will improve work quality.

The current stage of development of the country's economy requires great attention to questions of accelerating scientific-technical progress and of the fastest possible practical introduction of all leading methods. Much depends on the planners in this regard. As of this year, the development of technical-economic justifications for building large and complex enterprises, and if necessary other facilities as well, is once again being introduced. Measures are being developed for the continued improvement of project planning work.

Success in the fulfillment of the construction program for this year depends on millions of workers. To make the final year of the five-year plan a shock year, to ensure the operational introduction of all planned facilities--this means to answer in deed the call of the CPSU Central Committee for a fitting reception to the 27th CPSU Congress.

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## MAIN CONSTRUCTION GOALS FOR 1985 PRESENTED

Moscow BYULLETEN' STROITEL'NOY TEKNIKI in Russian No 1, Jan 85 pp 2-4

[Article: "Plans for the Final Year of the Five-Year Plan"]

[Text] Our Homeland has entered into the last, completion year of the 11th Five-Year Plan, a year of active preparation for the 27th CPSU Congress. The Soviet people are selflessly working on the successful completion of the five-year tasks and the creation of a good, reliable stockpile for an assured start to the 12th Five-Year Plan. Massive socialist competition is being expanded for a fitting celebration of the 40th Anniversary of the Victory in the Great Patriotic War and the 50th anniversary of the Stakhanov movement.

The state plan for USSR economic and social development for 1985 was examined in detail in November of 1984 at a meeting of the CPSU Central Committee Politburo, and then unanimously ratified by the second session of the USSR Supreme Soviet 11th Convocation. The intensive but realistic plans of the party and the people for 1985 are based on a firm economic foundation, are presented on a large scale, and are extremely specific. New boundaries have been defined in all sectors of the national economy, which are aimed at the effective return on the country's strong production and scientific-technical potential and at the achievement of high end results.

In the past year, there was a continuation of the development of positive tendencies in the economy which had been outlined in 1983. These were due to the extensive organizational and political-education work of the Communist Party, the increased labor activity of the masses, and to measures for strengthening responsibility, order and discipline in the national economy. Machine building, the chemical, gas, microbiological and certain other sectors which defined scientific-technical progress developed at an unprecedented rate. The volume of industrial production increased by 4.4 percent, as compared with 3.8 percent envisioned in the plan. This result is an indication of the growing influence of intensive factors in the development of our economy on the basis of improving the structure, engineering and technology of production, organizing labor and management, and a broader practical introduction of scientific-technical innovations.

In 1984, as in past years, an extensive program of capital construction was implemented. The operational introduction of fixed capital at the expense of

state capital investments comprised 136 billion rubles, which was a significant addition to the production potential of our country. By the end of the year, the cost of fixed production capital comprised around 1.5 trillion rubles.

Many important facilities at new and reconstructed enterprises within various sectors of the national economy were placed into operation. Among these we must note especially the ahead-of-schedule completion of construction of the main railroad line and the opening of train traffic along the entire extent of the BAM [Baykal-Amur Main Line]. Counting all the sources of financing, 113.7 million square meters of overall residential housing area was built, which made it possible to improve the housing conditions for approximately 10 million people. There were more pre-school institutions, general education schools, hospitals and polyclinics built than were envisioned by the five-year plan for 1984.

However, as the USSR Supreme Soviet session noted, even though a certain improvement was noted in capital construction, the state of affairs on the whole cannot be considered satisfactory. The tasks for operational introduction of fixed capital and production capacities were underfulfilled. The shortcomings in the organization of building production were slow in being corrected. As before, large sums were dispersed over numerous facilities, cost estimate discipline was disrupted, and there were cases of poor work quality.

The plan for 1985, which is the base period for the 12th Five-Year Plan, is oriented toward increasing intensification and raising the technical level of production, toward the dynamic and proportional development of the economy, and toward the maximal utilization of the production and scientific-technical potential and intra-economic reserves. High tasks have been set for indicators of social production effectiveness, and primarily for the growth of labor productivity and application of fixed capital and production capacities. The realization of the program for capital construction is of great importance in the successful fulfillment of the plan assignments.

For the current year the plan outlines the further development of sectors within the fuel-energy complex. The production of electrical power will reach 1,540 billion kW·hr, and its overall growth will comprise 55 billion kW·hr. Over two-thirds of this growth will be obtained at atomic and hydraulic power stations. Provision has been made for the introduction of capacities at the Kursk, Balakov and Smolensk AES [Atomic Power Station] and for a power unit at the Zaporozhye AES. New units will be placed into operation at the Sayano-Shushensk, Maynsk and Baypazinsk GES [Hydroelectrical Station], and four turbines at the Zhinvali GES. The Neryungrinsk GRES [State Regional Electric Power Station] will be introduced to its full operating capacity, as will be the new capacities at the Berezhovskiy GRES-1. Work will continue on primary structures of the Boruchanskiy GES and on the construction of the Rogunskiy GES. Preliminary work will be conducted on expanding the Armenian AES and the development of a regional production base for the construction of the Central Yenisey GES will be undertaken.

The extraction of oil and gas condensate is planned in the amount of 628 million tons, and of gas--in excess of 632 billion cubic meters. The entire growth in

extraction of oil and gas throughout the country will be obtained due to the increase in their extraction in West Siberia. As before, the primary fuel-energy base of the country will be the West Siberian territorial-production complex, which will yield two-thirds of the all-union extraction of oil and over half the gas.

Coal extraction in the current year will comprise 726.2 million tons. In the Kuzbass, the operational introduction of new capacities for open pit coal mining is planned, as well as the reconstruction of a number of existing mine shafts. New capacities for coal extraction will be placed into operation at the Berezovskiy Open Pit Coal Mine No 1 and at the Pavlodar-Ekibastuz territorial-production complex and the South Donbass Shaft. The Neryungrinskiy Open Pit Coal Mine and a number of other facilities will be introduced to their full operating capacity.

The planned levels of production of electrical energy and extraction of all types of fuels with consideration for the increased export of fuel-energy resources require their thrifty application. Particular attention must be focused on the economy of motor fuel. For this purpose, the changeover of the automobile pool to diesel fuel will continue, as well as the transition of motor vehicles to compressed and liquefied gas.

Within the complex of sectors producing construction materials, an increase in the volumes and improvement in production structure has been planned due to the ahead-of-schedule growth in the output of highly effective types of production. The growth in production of progressive construction materials will comprise 6.5 percent, while the output of traditional types will increase by only 1.6 percent. There will be 109.4 million tons of rolled ferrous metal stock produced, and 19.7 million tons of steel pipes. The leading rate of growth in the production of economical types of metal products makes it possible to save 1.3 million tons of rolled ferrous metal stock in the national economy as compared with 1984.

There are plans to perform a significant volume of work on strengthening the mining base and on technical retooling of the Norilsk Mining-Metallurgical Combine, and to place into operation the capacities for ore production at the Krivorozhskiy Mining-Concentrating Combine and the capacities for rolling ferrous metals at the Zhdanov Plant imeni Il'yich. In Belorussia, the construction of a plant for the production of products made of metallic powders will continue, as will the assimilation of capacities at the Belorussian Metallurgical Plant. In Kazakhstan the capacities of the Karaganda Metallurgical Combine will be increased. In Moldavia a metallurgical plant will be placed into operation.

In non-ferrous metallurgy, the production of many important types of products will increase. Particular attention will be given to the development of secondary non-ferrous metallurgy, to the expansion of capacities for processing scrap and non-ferrous metal by-products, and for improving the quality of metals and alloys made from them. Among the most important construction sites in this sector we may note the operational introduction of capacities for the extraction and processing of non-ferrous metal ores at the Dzhezkazgan Mining-Metallurgical Combine and at the Zhayrem and Zhezkent Mining-Concentrating Combines.

In the lumber, wood processing and paper-cellulose industry, a growth in production of lumber materials is envisioned due to the more effective application of raw material resources and the increased output of progressive materials. The production of splint slabs, laminate plywood, industrial wood chips, cellulose, paper and cardboard will develop at a leading pace.

The output of cement in the current year will comprise 132 million tons, and 8.54 billion standard sheets of slate. The production of building materials is planned with consideration for the needs of capital construction, repair work, and for the expanded sale of these products to the population.

Considering the decisive role of machine building in the technical retooling of all sectors of the national economy and in accelerating scientific-technical progress, the plan for the current year provides for the leading growth of production in machine building and metal processing, whose output will increase by 6.5 percent. Machines and equipment will be directed primarily toward fulfilling the tasks of the Food and Energy Programs and toward the introduction of resource-saving technology, provision of start-up construction sites for 1985, and technical retooling and reconstruction of existing enterprises.

In the current year, 57 billion rubles in capital investments have been allocated through all sources of financing for the development of sectors of the agro-industrial complex. This is somewhat higher than the figure envisioned by the five-year plan for this year. At the same time, there is a significant increase in the investments intended for safekeeping of the manufactured product, and in the processing sectors--for the creation of additional capacities which would make it possible to accelerate the processing of raw materials. Considering the need for accelerated development of the microbiological industry for the intensification of agriculture, 200 million rubles more in capital investments have been allocated for the development of this sector as compared with the figure envisioned in the five-year plan.

At the present time, thanks to land reclamation, the problem of satisfying the country's needs for cotton and rice has generally been solved. The portion of irrigated lands accounts for a significant part of the growth in production of fodder, vegetables, fruits and grapes. Large capital investments are being directed this year toward land reclamation--over 9 billion rubles. At the expense of these funds, 663,000 hectares of irrigated land and 695,000 hectares of reclaimed land will be introduced. By the end of the five-year plan, the overall area of reclaimed land will comprise around 35 million hectares, as compared with 29.8 million hectares in 1980.

The network of railroad lines will also undergo further development in the current year. The plan calls for the operational introduction of over 1,300 kilometers of new railroad lines and around 700 kilometers of secondary lines. There will be 1,500 kilometers of railroad lines supplied with electrical power and 2,200 kilometers equipped with automatic blocking. The network of general use automobile roads will increase by more than 12,000 kilometers, including 8,000 kilometers of roads of oblast and local significance. Thanks to this, the auto transport communications of kolkhozes and sovkhozes with the regional centers will be strengthened.



The plan for capital construction for the current year has been developed with consideration for the requirements of the resolution by the CPSU Central Committee and the USSR Council of Ministers entitled "On Improving Planning, Organization and Management of Capital Construction," as well as with consideration for the need for ensuring the fulfillment of the Food and Energy Programs, increasing the effectiveness of social production, accelerating scientific-technical progress, and continually developing residential and social-domestic construction. On the whole throughout the national economy, the capital investments from all sources of financing were defined in the sum of 175.1 billion rubles, and state capital investments--154 billion rubles. Here, leading growth rates in capital investments are envisioned in the sector of the fuel-energy complex, in the raw material sector, and in machine building.

The limits of state capital investments for the development of agriculture for the entire complex of operations are taken within the amounts established by the five-year plan for this year. Part of them is directed toward the growth in production of equipment and machines for agriculture and toward the microbiological industry. The capital investments for such sectors of the agro-industrial complex as the fish, food, flour milling-cereal and microbiological industries have been envisioned slightly higher than those provided in the five-year plan for 1985.

Much attention in the plan for capital construction has been given to the technical retooling and reconstruction of existing enterprises. The capital investments directed toward these purposes will comprise 30.5 billion rubles, which is 4.3 billion rubles greater than the five-year plan assignments.

The tasks for the operational introduction of production capacities have been established based on the need for concentrating capital investments, material resources and capacities of contracting organizations at start-up construction sites. Fixed capital in the amount of 146.4 billion rubles will be introduced into operation at the expense of state capital investments. This figure is 7.6 percent greater than in 1984, with a 5.5 percent growth in state capital investments. This will make it possible to reduce the volumes of unfinished construction to values close to the normative values by the end of the five-year plan. On the whole throughout the national economy, including capital repair, work in a volume of 90.6 billion rubles will be performed through the efforts of state contracting organizations. This is 3.8 percent over the plan for 1984.

The plan provides for a significant volume of residential construction. Through all the sources of financing, residential houses with overall area of 114 million square meters will be built, which is 10.7 million square meters more than the figure envisioned by the five-year plan for this year. The scope of cooperative and individual construction will also increase. The operational introduction of cooperative houses will increase by almost 19 percent, and of individual--by 10 percent. On the whole during the five-year plan, counting all the sources of financing, residential houses with overall area of around 555 million square meters will be built in the cities and rural areas. This is 25 million square meters more than the task set in the five-year plan. This will make it possible to improve the housing conditions of over 50 million people.

The plan for 1985 provides for a significant expansion in the network of public education, public health and cultural institutions, and an improvement in the social-cultural services to the population. Pre-school institutions for 630,000 pupils will be placed into operation, general education schools for 951,000 students and hospitals for 60,000 beds, etc. will be built.

A task of great economic and social significance is the intensification of environmental protection. The plan for the current year provides for the fulfillment of a series of measures in this sphere. Around 2.5 billion rubles in state capital investments have been allocated for the implementation of environmental protection measures.

As CPSU Central Committee Secretary General and Chairman of the USSR Supreme Soviet Presidium, comrade K. U. Chernenko, stressed, capital construction is one of the key problems. Here, a high rate of growth, a high concentration of resources, and better provision with materials, machines and mechanisms are anticipated. This gives a basis for hoping that builders will be able to put an end to rush work, will improve their work quality, and will fulfill the plan assignments.

An intensive construction program is to be fulfilled in 1985. Precise and goal-oriented work is needed in order to bring to life all that has been outlined and to introduce start-up facilities into operation on schedule. The plan must be unconditionally fulfilled, and wherever possible and necessary--overfulfilled. To successfully implement the construction program of the current year and the five-year plan as a whole and to create a reliable stock-pile for an assured start to the 12th Five-Year Plan--this is the patriotic duty of Soviet builders.

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COMPUTERIZATION OF CAPITAL CONSTRUCTION PLANNING VIEWED

Moscow EKONOMIKA STROITEL'STVA in Russian No 11, Nov 84 pp 29-31

[Article by R. Zh. Arays, candidate of technical sciences, chief of the NIIP section, Latvian SSR Gosplan; P. P. Blau, deputy head of the Capital Construction Section, Latvian SSR Council of Ministers; and U. I. Osis, senior NIIP scientific worker, Latvian SSR Gosplan: "Program-Target Planning and Management of Capital Construction in the Union Republic"]

[Text] Beginning with the 9th Five-Year Plan, work has been conducted in the Latvian SSR on the introduction of the program-target method in solving various national economic problems. Among the basic socio-economic problems in the republic whose solution was implemented on the basis of this method was the development of capital construction and its material-technical base.

The initial basis for program-target planning and management in the Latvian SSR is the result of an analysis of the state of the economy. The analysis makes it possible to define the key questions, the disruption of proportions, and the "bottlenecks" in the development of sectors of the national economy. As a result, the priority directions for economic development are formulated, as well as the republic target integrated programs (RTsKP) which correspond to them. The simultaneous development of a group of such programs by various priorities makes it possible to define the construction objects whose timely operational introduction is of particularly great significance for the successful development of the national economy.

The development and realization of target integrated programs presupposes the development and functioning of a corresponding program-target organizational structure. In the Latvian SSR this structure is built according to the hierarchical principle and consists of several levels--the higher, the middle, and the executive level.

The Central Coordinating Commission is formulated for overall management of the development and realization of target integrated programs. Its working organ is a structural subsection of intersectorial or sectorial management. As a rule, the commission is headed by the deputy chairman of the republic Council of Ministers or a minister--the director of a ministry or department--who is the head program coordinator. The make-up of the Central Coordinating Commission includes the directors of ministries, departments and organizations, the chief

executives of subprograms, as well as scientists and specialists on the given problem.

A lead organization (ministry or department), which serves as the head coordinator of the program, is named for the direct development and realization of the RTsKP. For example, the head coordinator of the Integrated Program entitled "Priority Directions for Further Increasing the Effectiveness and Quality of Capital Construction in the Latvian SSR" is the republic Gosstroy [State Committee on Construction Affairs]. The Central Coordinating Commission and the head coordinator of the program form the highest level of the program-target organizational structure, which implements management and long-term (prospective) decision making and defines the end results of the program as a whole, the volume of resources necessary for its realization, and the overall coordination plan for implementing the program.

Effective management of the activity of subprogram executors and its coordination and on-going control are implemented at the middle level of the program-target organizational structure. Related to this level are the ministries and departments--the head subprogram coordinators, the program-target management group, and other subdivisions.

Direct realization of the integrated target program of measures, tasks and operations, and fulfillment of decisions made at the higher and middle organizational levels is done at the executive level of the program-target structure. This level includes enterprises, organizations, and rayon effective management groups.

The most important prerequisite for the effective functioning of the program-target organizational structure in capital construction is the widespread application of economic-mathematical methods and electronic computers. In this connection, the Scientific-Research Institute on Planning of the Latvian SSR Gosplan, with participation of managers and specialists from the program-target construction management group (PTsUS) of the Latvian SSR Council of Ministers, the republic TsSU [Central Statistical Administration], the Latvian SSR Ministry of Construction, the republic Latvkolkhozstroy Association, customer organizations in construction and other interested organizations, has developed an automated system of program-target construction management (ASPTsUS).

The functioning of the ASPTsUS is ensured by plan, standard and operational information collected in an automated data bank of the main computer center for collective use by the NIIP of the Latvian SSR Gosplan. The automated data bank stores information on each construction facility, and, with the aid of a dialog informational deviation control system (DISKO), the program-target construction management group has the ability, within the limits of its jurisdiction, to implement operational intervention for the purpose of eliminating reasons for lagging behind in cases where any deviations arise in the performance of program work.

Operational information on the course of work performance at priority construction sites, as well as on their provision with building materials, is presented by the rayon program-target construction management groups.

The development of the method and procedures of program-target management of construction, the introduction of ASPTsUS, and a number of other integrated measures are yielding positive results. As early as 1979, a short-term program for the construction of lightweight hog raising facilities was successfully implemented in the republic on the basis of program-target management. In 1982 the plan assignments for residential construction at the expense of state funds were overfulfilled by 103 percent in the republic, and starting in 1983 the fulfillment of established quarterly plan assignments for residential construction on the whole had stabilized.

The obtained results testify to the high effectiveness of measures for the development of program-target management of capital construction. At the same time, the potential possibilities of the program-target method are still far from being fully utilized. At the present time there are a number of unresolved methodological and organizational problems which make it impossible to utilize this method more effectively and to ensure on its basis the necessary rates of scientific-technical progress and growth of labor productivity in construction.

The Integrated Program for Scientific-Technical Progress in the Construction Complex and the republic's Target Integrated Program for Development of Construction have been called upon to solve the problems of scientific-technical progress and intensification of building production. However, at the present time these programs are insufficiently tied in with the republic's target integrated programs in which the lists of priority facilities are formulated (food production, residential construction, etc.). As a result, the programs for scientific-technical progress and development of construction still have a weak effect on the actual indicators for effectiveness of capital construction.

An analysis of these programs shows that many of the economic, scientific-technical and organizational measures included in them which were proposed by the ministries and departments have low indicators of realization effectiveness, including also the indicators on economy of labor. At the same time, a number of highly effective measures are not included in the integrated programs due to the lack of confidence by the executors of their resource provision. As a result, the integrated programs which are developed are for the most part reminiscent of a summary of various departmental plans for organizational-technical measures rather than an integrated plan document oriented toward achieving a single end goal or group of goals.

One of the main advantages of the program-target method, in our opinion, is the fact that the selection of measures for inclusion in the appropriate integrated target programs is done from the standpoint of achieving the established ultimate national economic goals, and is not based on the "convenience" of realization of these measures by one economic segment or another.

V. S. Kulibanov examines certain decisions which are correct in our opinion, regarding the utilization of these advantages of the program-target method.<sup>1</sup>

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<sup>1</sup> EKONOMIKA STROITEL'STVA, 1983, No 11.

Supporting the opinion expressed by V. S. Kulibanov regarding the prediction of strategic goals and limitations as the first step and the initial basis for development of an integrated program of scientific-technical progress, we nevertheless believe that the order of giving assignments to ministries, departments, enterprises and organizations on the economy of resources and growth of certain indicators in their operation, though tied in with the goals of the program, still essentially differ little from the existing methods of planning analogous indicators in traditional plans for assimilation of new technology. Therefore, there is hardly a sufficient basis for anticipating a significant increase in the effectiveness of the programs as compared with the noted plans.

We believe that the following approach to program-target planning and management of scientific-technical progress in capital construction is more effective.

At the first stage, in the development of the Integrated Program of Scientific-Technical Progress in the Construction Complex, the changes in the basic target indicators are predicted and coordinated with the needs for development of the national economy. These are the rates of changes in capital investments, in volumes of construction-installation work, in labor productivity, in material consumption, in capital-labor ratio, in estimated cost of construction, etc. Then the main factors influencing the dynamics of these target indicators are defined and the degree of this influence is evaluated. Then, a set of technical, economic, organizational and other innovations is formulated for each of the factors, with the introduction of these innovations necessary for ensuring the required rates of change in the target indicators. These are new progressive machine systems, production technology, building materials, architectural-planning and design decisions, etc. All the innovations included in the integrated program must have a unified list of indicators and parameters which make it possible to evaluate not only the different innovations by their effect on change in the target indicators, but also to compare them with each other.

It is specifically innovations with pre-given parameters and requirements for their scientific-technical level which, in our opinion must primarily serve as the basis for making specific assignments to sectors, enterprises and organizations, and not the abstracted indicators of dynamics of labor productivity and economy of resources which are often posited. The participation of enterprises and organizations in the realization of program tasks and measures for the development and assimilation of innovations does not always need to be tied in with the requirements for improving certain operational indicators. It is much more important--and this is the basic concept of the program-target method in construction--to see that the development and introduction of innovations ensuring the "output" of ultimate target indicators of the integrated program is guaranteed as a result of implementation of the measures envisioned in the program.

The questions of providing the development and assimilation of innovations with the necessary labor, material and financial resources are resolved in the program based on the technical-economic indicators of these innovations, which are determined in the formulation of the initial requirements for them.



In connection with the increased role of the program-target method in planning and management, it would be expedient to expand the experimental verification of the efficiency of various economic, financial and other levers in capital construction which facilitate increased interest on the part of the builders, planners, and manufacturers of building materials and structures in the development and assimilation of innovations which have a higher economic and social effect.

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CONSTRUCTION PLANNING AND ECONOMICS

NEW COST ACCOUNTING METHOD FOR CONSTRUCTION LABOR

Vilnius SOVETSKAYA LITVA in Russian 13 Nov 84 p 2

[Article by V. Vitkauskas, candidate of economic sciences: "The Test Has Been Passed. The Search Continues. On Certain Results of the Application of a Measurement Device for Standard Specific-Net Production in Construction"]

[Text] In the interrelations between builders and customers there are sometimes cases when the former receive money seemingly for nothing. How does this happen? We know that finished structures and materials comprise an average of no less than 60 percent of the overall estimated cost of the facility. In order to assimilate these funds, builders need only, figuratively speaking, to "lift their finger." After all, as an example, structures are installed with the aid of mechanisms. Computations show that, having given installation work a total of 7 percent of the labor expenditures, builders assimilate up to 40 percent of the estimated allocations. Thus, if we judge by the volume of assimilated funds, this volume must be almost half finished.

At the start-up facility, however, the picture is entirely different. There, in performing finishing work 30 percent of the labor expenditures make it possible to assimilate only 5 percent of the funds provided in the estimate for the facility as a whole. This too is understandable. Manual labor is prevalent in finishing operations, and the output is only half of that of a project which is underway, and the wage fund is insufficient.

These simple truths for a long time determined to a significant degree the strategy and tactics of the work of builders, who tried by every means possible to begin construction on more and more facilities and to fulfill expensive constructions, even at the expense of disrupting the technological work sequence. All this was done to reduce the relative share of the wage fund in the overall sum of expenditures. As a result, a paradoxical situation arose. It would seem that the relative share of the wages was reduced. Consequently, the money is spent more effectively. The volumes of assimilated funds are increasing, and this means that builders are working better from year to year. Yet at the same time, on this bright background--the number of facilities introduced into operation did not increase and unfinished production was continuously expanding.



In order to overcome this negative tendency, effective 1 January 1980 a new measurement device was introduced into the practical application of builders in our republic--the standard specific-net production (NUChP), whose make-up does not include the cost of materials and structures. The NUChP has made it possible to more objectively evaluate the real labor expenditures and, by equating the "profitability" of work at semi-finished and start-up facilities, has thereby ensured a more uniform influx of money from the customer for payment of builders' labor wages.

Any innovation which is introduced into practical application gains not only proponents, but also opponents. Even now, when almost 5 years have elapsed since the introduction of NUChP, there are some contradictory opinions expressed. These range from full acceptance to complete rejection. The truth is, as is often the case, somewhere in between. And we must attempt to find it by soberly evaluating the situation.

However, first of all, we would like to point out one detail. Many economists call the NUChP a new indicator. This cannot be considered correct. Builders have not added any new indicators. Their activity, as before, is evaluated by the growth in labor productivity and volumes of fulfilled work. However, while before these indicators were measured by estimated cost of construction-installation work, now they are measured by standard specific-net production. Therefore the NUChP is more correctly considered a measuring device for work volume and labor productivity.

What does the application of this new measuring device give us?

First of all, the results of work of the Lithuanian SSR Ministry of Construction on introduction of facilities speak in favor of it. Thus, in 1980-1983, all the vital facilities of production and social-domestic function were submitted for operation and the plan for operational introduction of housing was significantly overfulfilled. The volume of unfinished production dropped from 63.2 percent (in 1979) to 47 percent (in 1983).

The question of effectiveness of utilizing funds going toward wages requires closer examination. We must note that the introduction of NUChP has facilitated a reduction in the rate of wage increase per ruble of performed work. Thus, in the 4 years preceding the introduction of the new measurement device, the expenditures of the wage fund per ruble of work increased by 13.5 percent. However, in the next 4 years (when the new measurement device was already being used), these expenditures increased by only 9.1 percent.

Among the circumstances which have led to this positive shift we may name the following. In recent years, cases of transferring people and technology from start-up facilities to semi-finished ones have practically been eliminated within the Ministry system, cases of damaged goods and work to be done over have been reduced to one-half the previous amount, work technology is being better observed, and the time for building facilities has been reduced by approximately 12 percent (1982). To this we may add the more effective application of means of mechanization. Deserving of particular attention is the fact that within the overall wage expenditures per ruble of construction-installation work, the

relative share of payments from the material incentive fund has increased (up to 5 percent in 1983). This has become possible thanks to the fact that the introduction of NUChP has practically equated the output at semi-finished facilities and at those being completed.

One of the conditions for the successful implementation of the new measuring device is the clear definition of NUChP in the project-estimate documentation. Prior to 1981 this labor consumptive work was performed through the efforts of the builders themselves. In 1981-1982 part of the load was gradually taken on by the project planning organizations. However, at present, due to the transition to new estimate prices and valuations, work on planning and accounting for the NUChP must be begun at the initial level. Builders are already for the third time assimilating the new standards and methodology of accounting. In many cases they are forced to isolate the NUChP from the estimate documentation by their own efforts, working ahead of the project planning institutes. Naturally, frequent changes in methodology rob the new measurement device of prestige in the eyes of the economic managers.

Computations show that for normal functioning of building production, the standard volume of unfinished production must comprise an average of no less than half the volume of production performed through their own efforts. Consequently, by systematically reducing unfinished production, the organizations of the republic Ministry have not only approached, but have even overstepped this boundary. Further progress in this direction is fraught with rather negative consequences. In connection with this, a series of measures have been taken which, we hope, will facilitate the renovation of growth in the volumes (to standard dimensions) of unfinished production. However, here we must note that a strictly applicational interpretation of NUChP removes the basic goal of introducing the new measuring device into the background. This goal is the improvement of planning in construction. In this connection, the question arises: isn't it simpler to regulate the level of unfinished production by means of including the indicator on creation of stockpiles in construction in the number of basic indicators for evaluating the work of the organization?

At the present time, interesting proposals are appearing in the press as well as in scientific circles on improving the measurement of the production volume and labor productivity in construction. However, the new ideas, which are at times theoretically sound, have still not passed the test of practical application, while builders have already felt the advantages of the NUChP method in their work.

However, no matter how convincing all we have said above regarding the new measurement device may sound, it is in itself no panacea which is capable of ridding one building organization or another of serious errors in planning and organization of the production process. The NUChP may be used with a high economic return only on the basis of a well-adjusted operation, when all the segments of the construction conveyor work not only with precision, but with a full load. Otherwise the new measuring device will be discredited.

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## RECOMMENDATIONS TO RAISE TECHNICAL LEVEL OF CONSTRUCTION

Moscow PROMYSHLENNOYE STROITEL'STVO in Russian No 1, Jan 85 pp 15-18

[Article: "Recommendations of the All-Union Conference, 'Scientific and Technical Progress in the Organization and Technology of Construction Performance in Industrial Construction,' Which Was Held by the Construction-Industry NTO [Scientific and Technical Society] and USSR Gosstroy 14-15 September 1984 in Donetsk"]

[Text] The 26th CPSU Congress and later CPSU Central Committee Plenums assigned the builders the tasks of further building up the country's production potential, raising the engineering level and quality of the construction product, increasing capital-investment effectiveness and intensifying construction-work performance.

In recent years the builders have made a considerable contribution to the further development and improvement of the deployment of productive forces and to a steady rise in the people's living conditions. Thus, during the Ninth, 10th and the first 3 years of the 11th Five-Year Plan, more than 3,200 new industrial enterprises and more than 1.3 billion m<sup>2</sup> of apartment-house space were built and put to use. Construction and installing work volume increased 1.9-fold. The technical level of construction rose greatly. Thus, in 1983 the share of fully prefabricated construction in the total volume of contracting operations that were performed by the main construction ministries was 40 percent, 64 percent of which consisted of large-panel and box-module housing construction. During the last decade the amount of mechanized equipment per worker increased 2.2-fold. Labor productivity growth was 3.1 percent in 1983 versus 2.1 percent in 1982.

During the current five-year plan such effective organizational forms and methods as the component method of organizing the construction of industrial complexes, the outfitted-module method of erecting facilities, the rotating-duty method of organizing the construction of facilities, the erection of industrial equipment in large modules, and the brigade contract have been developed and introduced more widely. Operating processes that use efficient sets of machinery and standardized sets of mechanized implements, tooling and attachments are being introduced. The volume of use of new and highly effective building materials and of progressive constructional structure highly finished at the factory, which reduces labor expenditure at construction sites and raises work quality, has grown. A directive has started the establishment, and further development is being made, of the "Catalog of Standard Solutions for Components of Large Industrial Complexes."

Construction and installing organizations are executing model construction of 10 large industrial complexes and enterprises and of one experimental housing rayon for 25,000 residents. At these projects, the technical level has been raised appreciably and the pace of labor productivity growth that has been achieved is, as a rule, above the average. The construction and installing work volume performed by the brigade-contract method, including start-to-finish contracts, has risen. In 1983, 15 items of production capacity called for by the State Plan for the Economic and Social Development of the USSR, including a "3000" rolling mill for the Zhdanov Metallurgical Combine, the metallization department of the Oskol Electrical-Metallurgy Combine, capacity at the Gomsel'mash and Izhorsk plants and other facilities, have been put into operation.

At the same time, the level of scientific and technical progress achieved in the organization and technology of construction performance, the scale of introduction of advanced methods, and the degree of their influence on construction effectiveness still do not support the prescribed pace for increasing labor productivity, reducing the time taken to erect enterprises, buildings and structures, and cutting construction costs.

Many enterprises and facilities are being erected without observance of the solutions adopted in the designs for organizing construction [POS's] and work plans (PPR's). At the same time, many of them are being developed at a low level, without consideration of actual conditions and construction-time norms, do not call for the use of modern methods of doing the work, and do not exert proper influence on raising the technical level of organizing construction work. The Unified System of Preparing for Construction Work (YeSPSP) has still not become strictly mandatory.

At some construction projects technological and production discipline are not observed, work quality is low, and the specific expenditure and share of manual labor are high. New equipment is not used in adequate amounts, and scientific developments are being introduced slowly. Nonproductive expenditures of labor and equipment time occur. Material losses still are great. Certain model construction projects still do not meet modern demands for the organization and technology of doing construction work, and the tasks prescribed for construction and installing work volume and labor-productivity growth are not being coped with. There are instances of late provisioning of model construction projects with design and budget-estimating documentation and with labor, material and equipment resources.

The activity of scientific-research institutes and technological-planning organizations--orgtekhstroy [state trusts for industrializing construction work]--is not sufficiently oriented to working out problems of the organization and technology of construction that relate to maximal reduction of labor and materials intensiveness of construction, to reduction of research and development time and to speeding up introduction of the results thereof into construction. The job consists in raising the level of organizing construction work, improving its technology, raising considerably the level of mechanizing the work and, on that basis, of raising labor productivity, and improving the quality and reducing the prime costs of construction and installing work.

In order to provide for fulfillment of the decisions of the 26th CPSU Congress and of later CPSU Central Committee Plenums and to perform the tasks that



ensue from the CPSU Central Committee and USSR Council of Ministers Decrees of 18 August 1983, "Measures for Accelerating Scientific and Technical Progress in the National Economy," and of 29 April 1984, "Improvement of the Planning, Organization and Management of Capital Construction," particularly a further rise in the technical level of organizing construction work and of introducing effective operating processes for the performance of construction and installing work tasks, the All-Union conference recommends:

1. That ministries and agencies and contractors and clients focus attention on improving construction-work performance, developing more effective trends in scientific and technical progress in the organization and technology of construction and installing work, and introducing widely into construction the following organizational and technological solutions:

1.1. In the area of organizing construction-work performance:

1.1.1. In order to provide for wide introduction of the component method for designing, preparing for, and organizing and managing the construction of complicated facilities and large industrial complexes, design organizations should develop engineering documentation that takes into account the indicated method, calling for the breakdown therein of complexes into components, with calculations of the physical amounts of work, the labor intensiveness and the requirements for equipment, materials and constructional structure by component and by performing entity.

1.1.2. Expand use of the outfitted-module method of erecting enterprises, buildings and structures, for which purpose:

coordinate and approve a list of jobs for which use of the outfitted-module construction is mandatory; and

develop schemes for deploying outfitting and fabricating bases which prepare the box modules and the design and budget-estimating documentation for their construction.

1.1.3. Provide for the further development of the rotating-duty method of construction and a further increase in the mobility of construction and installing organizations for the purpose of building industrial enterprises in regions that are underdeveloped, difficult of access or far from construction-industry bases, for which purpose:

establish regions for the activity of mobile construction and installing organizations, giving consideration to the expansion, rebuilding and reequipping of existing and the establishment of new support bases for the construction industry and for the supply and equipment provisioning of construction; and

accelerate the rebuilding of manufacturing enterprises and provide for the production of off-the-shelf buildings and structures that are made of effective materials and constructional structure which meet modern requirements.

1.1.4. Provide for the further development of progressive forms of the brigade contract, for which purpose:

expand the introduction of the start-to-finish flowline brigade contract at construction projects;

systematically raise the qualification level of brigade leaders and introduce brigade and project NOT [scientific work organization] plans, and principal and long-range work plans with a schedule of the workload and the movement of brigades, after having provided for timely outfitting with the industrial production equipment in accordance with the schedules; and

equipping brigades with the sets of small-scale mechanized equipment specified by the norms, effective construction and installing tools, and operating rigging.

1.1.5. Raise the responsibility of construction organizations for strictly observing the solutions adopted in the POS's and PPR's and for achieving the final results of their activity.

1.1.6. Provide for further expansion and improvement of model construction, for which purpose see to it that model projects are actually models in the use of new equipment and advanced technology, in the comprehensive mechanization of construction, in savings of materials, fuel and power resources, in providing for high productivity and sophistication of the work and high quality of operations, and in introducing advanced domestic and foreign construction experience, bearing in mind that they should become, beginning in 1985, the standard (or model) for the organization of construction performance and of the work and for the achievement of high TEP's [technical and economic indicators] by all the country's construction organizations.

1.2. In the area of construction-work technology:

1.2.1. Provide for a considerable rise in the quality and organizational and technological level of documentation by introducing more rational solutions for the technology of erecting buildings and structures and for performing various types of operations, and also by expanding the use of constructional structure of increased readiness for erection, introducing operating processes that are comprehensively mechanized with the use of progressive types of tooling and mechanized tools and effective means for mechanization and automation, and by the introduction of modern methods for monitoring quality and insuring safety in construction and installing work.

1.2.2. Provide for a further rise in the technical level of performing earthmoving work by using effective earthmoving and transporting machinery and integrated mechanization of production processes, by introducing equipment for monitoring and controlling the operation of machines, and by intensifying the specialization thereof by the use of interchangeable equipment for earthmoving machines, and also by the creation of specialized organizations for doing earthmoving work.

1.2.3. Raise the technical level and quality of the production of monolithic concrete and reinforced-concrete structure by expanding the use of unified off-the-shelf formwork and raising its turnaround factor, by using efficient means for mechanizing and automating reinforcement operations and preparing, transporting and placing concrete mixes, and by the use of chemical additives, for which purpose:

organize plants for the central manufacture of reinforcement articles by specializing, consolidating and retooling existing departments and shops;



create specialized production facilities for manufacturing unified off-the-shelf formwork;

convert to the wide use of unified reinforcements and off-the-shelf formwork systems, specialized means for transporting and placing the concrete mix, and effective chemical additives, primarily superplasticizers;

furnish concrete-mixing facilities effective equipment for preparing and monitoring the quality of the concrete mix, and also for batching and preparing chemical additives;

introduce more widely progressive technology for doing concreting with the use of concrete-placing sets that are based on concrete pumps and automotive concrete mixers;

provide for mastering the output at subordinate enterprises of superplasticizers, including those made in the form of dry products; and

use more widely lightweight concretes that are based on porous aggregates obtained primarily from industrial waste (slag pumice, porous agglomerate, ash gravel, and so on).

1.2.4. Organize, within construction trusts, associations and regional main administrations that build in areas of concentrated construction, administrations and sections specialized in concreting; supply specialized subunits with the equipment and machinery for preparing, transporting, placing and working and curing concrete, and also with in-house operating rigging and formwork, provide them with repair bases and spare parts, and pave the way for the technical servicing of machinery.

1.2.5. Provide for further improvement and introduction of industrialized, more durable and less labor-intensive constructional structure for roofs, by expanding the output of efficient roofing materials of increased toughness and elasticity, with the maximum use of polymers and secondary raw-material resources and with comprehensive mechanization of roofing operations.

1.2.6. When installing waterproofing for the underground portions of buildings and structures, use more widely the experience of the PSMO's [industrial construction and installing organizations] of Gomel'promstroy [Gomel Industrial-Construction Trust] of BSSR Minpromstroy [Ministry of Industrial Construction] in the use of chemically resistant paste and chopped fiberglass, applied by means of a gun instead of by the traditional methods of putty and glue insulation, and their experience in waterproofing large-capacity structures by guniting a previously prepared aerated mix.

1.2.7. Provide for the further development and introduction of progressive methods for erecting constructional structure for buildings and structures and for installing the industrial equipment, after expanding large-module erection considerably, for which purpose:

use effective erecting methods that are based on the use of mechanized equipment with rigid implements for delivering and guiding the members being erected, which will provide for positive erection and disassembly of constructional structure, even in areas difficult of access; and

use the outfitted-module method for installing industrial equipment which is unitized with pipelines, auxiliary constructional structure, and monitoring and control instruments, and use also modular erection of metal structure for roofs with the consolidated assembly thereof.

1.2.8. Provide for the further improvement and introduction of effective structure for industrial floors, based on the use of polymers and the centralized manufacture of wall-to-wall linoleum floor, using effective measures for mechanization and methods for laying floors and for polishing and vacuuming them.

1.2.9. Raise the level of industrialization of finishing work by expanding the use of effective mechanized equipment and methods for doing finishing work, by decreasing the volume of "wet" processes, and by the use of dry mixtures, including those based on gypsum.

1.2.10. Provide for the further development of the automation of construction processes, for which purpose develop and introduce measures for the conversion of existing concrete-and-mortar units, departments and installations to automated modes with the use of serially produced batchers, control stations and pneumatic-control apparatus and for the conversion of earthmoving and transporting machines (scrapers, bulldozers and automotive graders) to automated control systems, which call for appropriate chapters in the plans for comprehensive mechanization and automation.

1.2.11. Provide for further improvement in the organization of work and of domestic services for the builders, for which purpose:

expand the network of schools of advanced construction-work methods, providing them with the necessary supply and equipment base; and

improve the housing and domestic-services conditions of the builders, primarily in poorly developed regions of Siberia, the Far North and the Far East, and at model construction projects, and also in the collectives of mobile construction and installing organizations.

## 2. Request USSR Gosstroy:

2.1. To complete in 1985 a review of existing standardizing documents that govern questions of organizing the performance of construction, including preparation therefor, and of developing designs for organizing construction (POS's) and work plans (PPR's), taking into consideration the wide introduction into practice of the achievements of science, technology and advanced domestic and foreign experience.

2.2. To prepare the necessary supplements and changes to the norms for constructional and industrial-production design (SN 202-81 and others), which establish the procedure for designing complicated industrial enterprises and large industrial complexes, with the mandatory use of the component and out-fitted-module methods.

2.3. To review the chapter in the SNiP, "Organizational and Technical Preparation for Construction," which is being prepared for issuance and tightens up the requirements for observing the rules of the "Unified System for Preparing for Construction (YeSPSP)," in regard to the mandatory fulfillment of

decisions on organizing construction work and the technology of construction and installing work that are adopted in the POS's, PPR's and standard flow sheets.

2.4. To work out in 1985, jointly with Minmontazhspestroy [Ministry of Installation and Special Construction Work] and other concerned USSR Ministries and agencies that are clients and contractors, and with the involvement of the appropriate scientific-research institutes, tasks for developing the outfitted-module method within the All-Union scientific and technical program for construction during the 12th Five-Year Plan, which requires that these tasks and steps cover the whole complex of questions about introducing this method, including design, development of the necessary standardizing documents, and the creation of bases and outfitting enterprises.

2.5. To develop and confirm in 1984 a statute about model construction and installing organizations, model construction-industry enterprises and model construction sites.

### 3. Request USSR Gosplan:

3.1. In coordination with USSR GKNT [State Committee for Science and Technology], to incorporate in the list of the most important All-Union scientific and technical programs for the 12th Five-Year Plan a specific-purpose program, "Master the Production and Execute the Delivery by Machinebuilding Ministries of Outfitted-Module Equipment for Industrial Production That is Highly Finished at the Factory."

3.2. To prepare jointly with USSR Gosstroy and concerned USSR ministries and agencies a recommendation on incentives for work by design and construction organizations for the rebuilding and reequipping of existing enterprises.

3.3. To develop jointly with USSR Gosstroy and other concerned organizations proposals for improving cost estimates for the execution of concreting when erecting monolithic structure.

3.4. To call for, in the production plans of USSR machinebuilding ministries and Minstroyaterialov [Ministry of Construction Materials Industry] for the 12th Five-Year Plan period, the manufacture of modular installations for new and rebuilt facilities (including boilerhouses, compressor stations, elevators and pump stations) for various branches of the national economy.

3.5. To examine, jointly with USSR Gosstab and USSR Gosstroy, the questions of establishing a procedure under which capital-investment allocations, ceilings on contracting work and on supply and equipment resources, and the issuance of technical documentation should be effected in strict accordance (as to quantity, variety and deadlines) with the approved POS's, in which the corresponding schedules are developed.

4. Request Minavtoprom [Ministry of Automotive Industry] to develop and organize the production of transport equipment for hauling large-size modules for industrial equipment, and also self-unloading equipment for transporting serially produced containers to facilities under construction.

5. Request USSR Minstroydormash [Ministry of Construction, Road and Municipal Machine Building]:

to speed up development of a construction-industry base in areas of the Far East, Siberia and the Far North;

to expand, in accordance with climatic regionalization, the use and the production of polymer-bituminous pastes for laying paste-on, nonroll roofs;

to increase the production of effective rolled built-up materials that weigh 2 kg per 1 m<sup>2</sup> of roofing layer and bring output volume thereof up to 150 million m<sup>2</sup> per year;

to expand the production of new, effective roofing materials, roll-type polymer film, and "krovelit"-type pastes;

to master the production of finished bituminous pastes in briquettes, in polyethylene packaging of 2-5 kg weight, for roofing and finishing work;

to increase the output of extrusion slabs, sheet materials and sheet products made of gypsum for the installation of partitions, hanging ceilings and wall facing; and

to organize the serial production of plastic pipe outfitted with shaped parts for sewerage, heating and water-supply systems.

6. Request Minpribor [Ministry of Instrument Making, Automation Equipment and Control Systems] to speed up the organization of serial production of automated batching-control systems, stations for controlling the preparation of concrete and mortar mixes, systems of increased information content about the operation of cranes, and systems for controlling earthmoving and transporting machinery that also enable control of the implements and engines.

7. Request Ministroydormash:

to take steps to expand volume and variety in the production of progressive equipment for small-scale mechanization and of effective hand tools for construction and installing organizations;

using Giprostrommash [All-Union State Design Institute for Building Machinery for Prefabricated Reinforced Concrete] and Gosstrommashina (as appropriate), to revise standard designs in order to provide for the reconstruction of currently existing concrete and mortar mixing installations, departments and plants, with reference to automated control systems and batching equipment now being produced serially; and

to speed up the mastery and serial manufacture of manipulators and robots for construction, installing and finishing work.

8. Request USSR Minvuz [Ministry of Higher Education] and the USSR State Committee for Vocational and Technical Education to provide for the training of specialists in PTU's [vocational and technical schools], tekhnikums and vuzes in the automation of construction work and the use of manipulators and robots.

9. Administrations and soviets of primary organizations of construction-industry NTO's should concentrate the efforts of scientists, engineers and technicians on:



the extension of practical assistance in raising the organizational and technical level of construction, including the realization of scientific and technical achievements and advanced domestic and foreign experience in design, the improvement of design solutions, a reduction in design time, and a rise in design to the world level; and the provisioning of good quality of development of construction-organization designs (POS's) and work plans (PPR's);

the fulfillment by construction organizations of plan tasks for putting production capacity and facilities, and also apartment houses, preschoolers' institutions, and facilities for public health and municipal services, into operation;

a reduction in the number of facilities being built simultaneously, with a view to bringing the volume of uncompleted construction down to the standard in the next few years; and

the completion in 1985 of the conversion to continuous two-year planning for the construction of apartment houses and facilities for social and personal-services purposes.

10. Request that Stroyizdat [Publishing House for Literature about Construction and Architecture], through periodic and special editions, publish annually a collection of information that illustrates advanced experience in the construction and rebuilding of industrial facilities and also achievements in the areas of the organization, technology and mechanization of construction and installing operations, in the light of fulfillment of this conference's recommendations.

The conference expresses confidence that, for purposes of a worthy greeting to the 27th CPSU Congress, the collectives of construction organizations, construction-industry enterprises and scientific-research and design organizations, based upon the wide development of socialist competition, will fulfill 11th Five-Year Plan tasks, provide for successful implementation of the party's and government's decisions to speed up scientific and technical progress and the decisions of the CPSU Central Committee Politburo to strengthen the supply and equipment base, to further industrialize construction, and to extend assistance to its development.

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## GREATER USE OF COMPUTERS URGED IN CONSTRUCTION PLANNING

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 1, Jan 85 p 16

[Article by L. S. Shkodenko, senior consultant of USSR Gosstroy's Scientific and Technical Council: "In USSR Gosstroy's Scientific and Technical Council"]

[Text] The Section for Improving the Technology and Automation of Design and the Section for the Economics and Organization of Construction Management of USSR Gosstroy's Scientific and Technical Council, and the Section for Cybernetics in Construction of the Central Administration of the NTO [Scientific and Technical Society] for the Construction Industry examined at a joint meeting the question of the problem of coordinating the composition, structure and form of presentation of design and budget-estimating documents produced by SAPR [automated design system] with the requirements of the ASU's [automated control systems] of the construction ministries, construction-industry plants and construction organizations, because of the reports of TsNIIproyektstal'konstruktsiya [Central Scientific-Research and Design Institute for Metal Constructional Structure] imeni Mel'nikov, USSR Gosstroy's NIIES [Scientific-Research Institute for Construction Economics], USSR Ministry [Ministry of Construction], Lithuanian SSR Minstroy, and the PTO [Production Equipment Section] of Promstroysistema [Industrial Construction System] of Belorussian SSR Minpromstroy [Ministry of Industrial Construction].

The sections noted the urgency of the question and the necessity for improving the composition and the structure of design and budget-estimating documentation, taking into account the requirements of SAPR, the automation of documentation processing in construction organizations, the necessity to adopt a unified computer-carrier based budget-estimating standards base and to adopt a juridical status for it, and the necessity to unify the software for automating the output of budget-estimating documentation.

The Scientific and Technical Council recommended that work be done in 1985 to improve design and budget-estimating documentation, keeping in mind a meeting of the demands that arise from the need to automate its processing in the construction-organization environment when preparing for the performance of construction and installing work, to establish a single products list of supply and equipment resources, and to organize the coordination of problems of mutual coordination in creating the methods, standard-instructional and other papers that determine the composition and content of design, budget-estimating, and organizational and management documentation.

The sections recommended that USSR Gosstroy's NIIES draw up measures for the creation and automated implementation of a budget-estimating standards base and of production norms for building-materials consumption; and that Minmontazhspetsstroy [Ministry of Installation and Special Construction Work] verify experimentally coordination of the composition and forms for presenting information to the SAPR and ASU's.

It was recommended that ministries prepare proposals on the composition, structure and form of design and budget-estimating documentation prepared by SAPR for use in systems designed for organizational-economics purposes, including SAPR.

The Section for Improving the Technology and Automation of Design, after examining the matter of the problem of automating preparation of the complete set of design and budget-estimating documentation in accordance with the report of KievZNIIEP [Kiev Zonal Scientific-Research and Design Institute for Standard and Experimental Design] of Gosgrazhdanstroy approved proposals for improving the structure and reducing design and budget-estimating document volume in accordance with the requirements worked out for the SAPR and the ASU's of metal-structure producing plants, taking maximum account of the peculiarities of the production process, questions of programing and technical support for SAPR, questions of training engineer personnel for operating with SAPR, and improvement of the organizational structure of the subunits of design institutes, taking into account the specifics of automating design.

The section recommended that KievZNIIEP develop recommendations on the composition and form of presentation of design and budget-estimating documents in the case of the automated design of nonindustrial buildings.

With the creation of integrated data banks for SAPR, it was proposed that TsNIIproyekt call for plan chapters that will provide support for the output of design and budget-estimating documentation by the automated method.

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CONSTRUCTION PLANNING AND ECONOMICS

UPDATE ON NEW TRENDS IN BELORUSSIAN CONSTRUCTION

Moscow BYULLETEN' STROITEL'NOY TEKNIKI in Russian No 11, Nov 84 pp 22-24

[Article by M. P. Pavlova, chief of the Standards and Specifications Section of BSSR Gosstroy: "In Belorussian SSR Gosstroy"]

[Text] Intensification of the Role of Expert Review of Designs and Budget Estimates

The republic's Gosstroy, on reviewing the state of expert review of design and budget-estimating documentation in Vitebsk and Mogilev Oblasts, noted that the oblast ispolkoms are taking definite steps to eliminate deficiencies in the organization and performance of the expert review of designs and budget estimates. Design-work and expert-review groups have been created within the Agricultural Administration, which in 1983 reviewed jointly with the Expert-Review Sections of the Vitebsk and Mogilev Construction and Architectural Administrations 179 designs which had a total budget-estimated cost of about 80 million rubles. As a result of this review, the budget-estimated cost for construction was reduced by 290,000 rubles and 26 of all the designs examined were returned for refinement. The Vitebsk Oblast Ispolkom took appropriate measures to enlist the services of highly qualified specialists for the expert review of designs.

At the same time, the expert-review organs of the Vitebsk and Mogilev Ispolkoms did not insure effective monitoring over design and budget-estimating documentation quality. They did not attach the proper significance to completeness of their critical study of design solutions and to quality of the constructional portion of the designs. The conclusions of these organs lacked an analysis of the completeness and correctness of the technical and economic indicators and did not compare them with similar jobs or with the standards for specific capital investment; and not enough attention was paid to the three-dimensional layout solutions, the plumbing and electrical-equipment chapters of the designs, firefighting, nature conservation and measures for saving the principal building materials and heat-engineering resources. The BSSR Gosstroy Administration for State Expert Review of Designs and Budget Estimates found cases where positive conclusions were issued for designs that had been developed with crude violations. For example, the detailed design for the rebuilding and expansion of the boilerhouse in Lepel (Vitebsk Oblast) was returned for further work because of serious errors in determining the budget-estimated cost of construction.

These and other deficiencies indicate that the Construction and Architectural Administrations and Agricultural Administrations of the Vitebsk and Mogilev Oblast Ispolkoms had not taken exhaustive measures to improve design and budget-estimating papers.

The republic's Gosstroy called the attention of BSSR Minsel'khoz [Ministry of Agriculture] to its failure to monitor the work of subordinate expert review subunits, recommended that steps be taken to man the expert-review subunits with highly qualified specialists, and extended the necessary informational and methodics assistance.

Also examined was the expert-review work of Belkoopsoyuz [Belorussian Union of Cooperative Artels] and its influence on raising the technical level and quality of designs. In considering the fact that substantial deficiencies were found in the operation of Belkoopsoyuz's Expert-Review Service by the BSSR Gosstroy Administration for State Expert Review of Designs and Budget Estimates, Gosstroy noted that it had not provided completely for a rise in economic effectiveness and quality of design and budget-estimating documentation in accordance with the requirements of the CPSU Central Committee and USSR Council of Ministers Decree, "Measures for Further Improving Design and Budget-Estimating Matters," and of the corresponding decree of the Tsentsosoyuz [USSR Central Union of Consumer Societies] Administration. The attention of the Belkoopsoyuz Administration was called to the lack of active monitoring over the work of the subordinate Expert-Review Section and Belkoopproyekt [Belorussian Institute for the Design of Consumers' Cooperative Facilities] in the matter of raising the quality of design and budget-estimating papers. Simultaneously, the republic's Gosstroy required the Belkoopproyekt Institute's management to eliminate the existing deficiencies in the work, to raise the technical and economic levels and quality of the design and estimating papers being developed, and to take part more actively in the experiment being conducted in the republic to reduce material and labor expenditure and to cut the budget-estimated cost of construction.

With a view to further raising design and budget-estimating documentation quality, the results of the check by the BSSR Gosstroy's Administration for State Expert Review of Designs and Budget Estimates on the status of the expert review of design and budget-estimating papers in Vitebsk and Mogilev oblasts, as well as in Belkoopsoyuz, were sent to the republic organizations concerned for review and for the adoption by them of the measures required for eliminating the noted deficiencies.

#### Seminar on Introducing the Brigade Contract.

A republic science and practice seminar, "Introduction of the Brigade Contract and the System for Two-Year Continuous Planning for Housing and Nonindustrial and Cultural and Domestic-Affairs Facility Construction," was based on construction projects, building-materials industry and construction-industry enterprises and construction organizations of Minsk Oblast and Minsk. Supervisors and responsible workers of the republic's construction and other interested ministries and agencies and their subordinate enterprises, design and scientific-research organizations, and party and soviet organs took part in its work.



Seminar participants were familiarized with introduction of the start-to-finish brigade contract in the example of the construction of single-apartment, large-panel farmstead-type houses at Sovkhoz 50 Let BSSR, which is being erected by the Soligorsk DSK [Housing-Construction Combine], and of a number of Slutskiy Rayon jobs that are being erected by contracting brigades of Slutsksel'stroy [Slutskiy Rayon Agricultural Construction Trust] of BSSR Minsel'stroy [Ministry of Rural Construction], particularly at the Leninskiy Put' Kolkhoz. Flowline construction in combination with the brigade contract was represented by the Minsk Oblast Mezhholkhozstroy [Interkolkhoz Construction Trust] in the construction of monolithic keramzit-concrete single-apartment houses at Kolkhoz imeni Lenin. The start-to-finish flowline brigade contract, based upon the introduction of two-year continuous planning of the construction of facilities for housing, cultural and domestic-amenity purposes, was widely represented at facilities being erected by Minskstroy [Minsk Construction Combine] in Minsk.

The results of the work of the republic's Minpromstroy [Ministry of Industrial Construction], Minsel'stroy, Minmontazhspetsstroy [Ministry of Installation and Special Construction Work], Mindorstroy (Ministry of Road Construction), Minvodkhoz [Ministry of Land Reclamation and Water Resources], Minavtotrans [Ministry of Automotive Transport], Minstroyaterialov [Ministry of Construction Materials Industry] and Minlesprom [Ministry of Timber, Pulp and Paper, and Wood Processing Industry], Belmezhkolkhozstroy, and other organizations on introducing the brigade contract and the system for two-year continuous planning for the construction of housing, nonindustrial, cultural and domestic-amenity facilities were cited at a plenary session.

The seminar's papers noted that the universal introduction of the brigade contract, including its highest form--start-to-finish flowline construction--was an important factor in raising construction-work effectiveness. More than 5,800 brigades, or 68 percent of the total number, were already working under the brigade-contract method in the Belorussian SSR in 1983. They did a total of 1,234 million rubles' worth of construction and installing work, which was 63 percent of all the work accomplished by their own forces; the figures were 67.9 percent for BSSR Minpromstroy, 66.1 percent for Belmezhkolkhozstroy, 61.9 percent for BSSR Minsel'stroy, and 61 percent for BSSR Minvodkhoz. The cost-accounting brigades saved 12 million rubles of planned expenditures, for which they were awarded bonuses in the amount of more than 2 million rubles. By working under the brigade-contract method, it was possible to cut construction time by 29,000 days, to turn over for operation more than 8,000 facilities and operating complexes, 88 percent of them on time or ahead of schedule, and to put most of the facilities into operation with evaluations of "good" or "excellent."

The data cited in the report of the Deputy BSSR Minister of Industrial Construction about the output per worker of contracting brigades, which was 14,250 rubles in 1983, almost 20 percent more than for the ministry as a whole, testify to effective work by the cost-accounting brigades. This enabled about 7,600 workers to be released provisionally for the amount of construction and installing work volume performed in 1983.

The seminar's papers also noted that wide introduction of the brigade contract, together with the economic benefit, provides for social effectiveness which is expressed in a rise in the activeness and conscientiousness of workers,

expansion of their participation in managing production, a strengthening of work and production discipline, and a reduction in personnel turnover.

As follows from the work experience of BSSR Minmontazhspestry, wide introduction of the brigade contract has required a radical restructuring of the whole system for preparing for construction, namely: prior to the start of installing work, the design and budget-estimating papers are analyzed thoroughly; the work plans, as a rule, are developed or coordinated to take account of the most rational technology and advanced experience for the operations; annual planning for the brigade's activity, which creates an important prerequisite for regularity of the work, based upon use of the flowline method and continuity of the installing work, is executed; plans for engineering and technological preparation are developed; the centralized containerized delivery of materials and articles in the prescribed amounts is called for; and questions of supplying cost-accountable brigades with progressive small-scale mechanized equipment and rational tools and attachments are decided. Total provisioning of standard sets of tools in this ministry is now 89.5 percent.

With a view to further dissemination and improving the brigade contract in BSSR Mindorstroy organizations, the level of current planning, engineering preparation, and the furnishing of complete sets of industrial-production equipment directly to the contracting brigade is being raised and cooperative brigades are being established.

Practical work experience of Belmezhkolkhozstroy indicated that the brigade contract gives appreciable results where it is used in most of a construction organization's brigades. Nesvizh MPMK-95 [Interkolkhoz Mobile Mechanized Column No 95], where practically all construction brigades have been converted to the brigade contract, has been cited as an example. While 77 percent of all construction and installing work (SMR) was performed by this method in 1980, the figure was almost 90 percent for 1983. This organization fulfilled the SMR plan for 1983 by 108.2 percent. Last year it was the winner each quarter in the oblast and republic socialist competition, and during the fourth quarter it was awarded the challenge Red Banner of USSR Minsel'stroy and the Central Committee of the industry's trade union.

The seminar paid great attention to the start-to-finish flowline contract, which was used widely in the republic in 1983. Joining the forces of the cost-accounting brigades of construction and installing organizations and construction-industry, outfitting, and automotive-transport enterprises, this method orients collectives to achieving a single goal--the introduction of facilities into operation with the greatest rapidity and with least expenditure of material and labor resources. Collectives of the Minsk Production Association for Industrialized Housing Construction (MPOID), the Grodno, Brest, Mogilev and Gomel DSK's and Slutsk SSK [Rural Construction Combine] have achieved appreciable successes by using this method.

The start-to-finish flowline method is being used most effectively in the MPOID system. Its high work indicators have been achieved to a great extent as a result of introduction of the brigade contract in all elements of the construction assembly line. In the first three years of the 11th Five-Year Plan it provided for a growth of 3.5 million rubles in construction and installing work volume; in 1983 productivity reached 101 percent of the plan, which was 103.3 percent of the 1982 level. An analysis of the work of MPOID's

cost-accounting brigades indicated that effectiveness in use of the start-to-finish brigade contract depends upon better engineering preparation of the facilities for construction and better factory preparation of KPD [large-panel housing construction] articles; improvement of design solutions; the correct use of various systems of material and moral incentives; the execution of operations by specialized brigades of optimal composition; the use of two-year schedules for flowline construction that are linked with the capacity of the KPD plants and of transport; the solution of administrative, planning and accounting problems directly in the brigade; deliveries of KPD materials and articles according to transport and erection schedules; and the organization of active socialist competition.

At a plenary session of the seminar, the participants adopted recommendations aimed at wide introduction of the brigade contract and of the system for two-year continuous planning for the construction of housing, nonindustrial, cultural and domestic-services facilities in the republic, providing for a substantial rise in capital-investment effectiveness, an increase in labor productivity, and improvement in construction quality.

#### In the Scientific and Technical Council

In accordance with a task of the Comprehensive Program for Automating Design Work in the Belorussian SSR During 1981-1985, Brestgrazhdanproyekt [Brest Institute for the Design of Nonindustrial Facilities] for the first time developed, introduced and is efficiently operating a technological line for automated design on a most massive scale of housing and nonindustrial buildings that are erected on continuous prefabricated footings, providing for continuity of the design process and the issuance of completed engineering documentation.

After examining the work experience of this institute in regard to automated design of the below-grade cycle for housing and social buildings erected on prefabricated continuous footings by using the ARM-S computer complex, the Presidium of BSSR Gosstroy's Scientific and Technical Council approved it and recommended the said technological line for wide introduction in design organizations of ministries and agencies of the republic, oblast ispolkoms and Mingorispolkom [Minsk City Ispolkom], which develop design and budget-estimating documentation for housing and nonindustrial facilities that are to be built.

The technological line for automated design (TLP) permits not only the computation but, what is especially important, the contriving and issuance of an optimally finished drawing of the footings plan with greatly reduced design time, high quality and much greater economy in cost and materials consumption than that of the design work performed by a design engineer. It realizes a set of tasks that characterize a continuous technological scheme--basic information, analysis of conditions, calculation, design and the drawings.

The TLP allows optimal prefabricated continuous footings of the 1.112-5 series to be designed on the basis of the building's constructional plan, the building loads, the construction site's geological conditions, and the local relief. The result of the work is a drawing that is complete in regard to construction-information volume and layout of the footing slabs, with

plotting of the axes and the dimensions and with the specifications and annotations. The line is oriented to the effective use of standard computer equipment and an interactive schedule, the foundation of which is the ARM-S(M) computer design complex, which is based on an SM EVM [International System of Small Computers). The system calls for the possibility of an active dialog of designer and computer, and its operation does not require lengthy special training, since the system was oriented to operating with a design engineer when the TLP software was developed.

Brestgrazhdanproyekt created a group of designers to work on the TLP who had been engaged prior to this in the traditional type of design. As experience indicates, the organizational and technical restructuring took place in one month, and a group of five people produces designs for prefabricated continuous footings for the institute's entire workload.

Experience on the part of Brestgrazhdanproyekt and a number of the country's other institutes in introducing TLP for continuous prefabricated footings lays the basis for considering that the system will enable design-work technology and organization to be moved to a qualitatively new level. In so doing, along with the high quality obtained, design time will be cut 3-fold to 4-fold, and large amounts (at least 20 percent) of prefabricated reinforced concrete will be saved. In the Belorussian experiment environment for saving material, labor and fuel and power resources, design of the below-grade cycle, based upon TLP, with issuance of an optimal variant, is especially urgent and is aimed at reducing the budget-estimated cost of construction.

The Presidium of the BSSR Gosstroy Scientific and Technical Council recommended that Brestgrazhdanproyekt Institute continue its work of raising the level of automated design of the below-grade cycle for housing and social buildings, and also spread the indicated method of design work to other constructional elements of buildings, such as wall panels, straight arches, ceiling-floor panels, and so on.

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CONSEQUENCES OF MATERIALS, LABOR SHORTAGES DECRIED

Ashkhabad TURKMENSKAYA ISKRA in Russian 11 Jan 85 p 2

[Article by R. Kardanova, economist, and N. Sosnina, TURKMENSKAYA ISKRA correspondent: "In a Crooked Mirror; 1. Plan and Construction Site"]

[Text] In May of 1984 the CPSU Central Committee and the USSR Council of Ministers adopted the resolution entitled "On Improving Planning, Organization and Management of Capital Construction." Do all of the measures implemented in the sector meet the requirements of this document? How well substantiated are they? Are they giving the anticipated result? These are the questions on which the authors of this economic overview express their opinions.

UNEVEN COSTS. We can probably apply this term to the consequences of non-uniform financing of major facilities in the chemical industry and of the mineral fertilizers sector by customers. What is happening here? At the end of the 10th and beginning of the 11th Five-Year Plans, the Chardzhoukhimstroy Trust, which was created in the region especially for building new capacities at the Chemical Plant imeni V. I. Lenin, built at a shock-work pace and submitted for operation units for the manufacture of sulfuric acid, and then of extracted phosphoric acid and ammophos. It would seem that the consolidated collective which had accumulated so much positive experience should continue to grow, particularly since there were considerable prospects for this. However, the union organs changed their initial plans. The development of the plant slowed down. The contract program "Chardzhoustoy" no longer corresponded to the trust's status.

Now it was no longer the trust, but the SMU [construction-installation administration] of Chardzhoukhimstroy, which had been lagging behind for a number of years, that slowly worked at the enterprise site, assimilating small sums. The irregular delivery of technological equipment also made it difficult to increase the work pace. Last summer there was a shortage of this equipment in the sum of 3.5 million rubles.

However, the start-up time of the new SK-49 sulfuric acid production is steadily drawing near. In order to submit this facility for operation, it is necessary to make a jump from assimilation of 7.9 million rubles per year to 21 million

rubles. In essence, it is necessary to again form the trust. Such are the "jokes" of planning. The specialists who have learned from bitter experience are concerned that the fate of another subdivision--Turkmenvostokneftstroy--will befall the Chardzhou builders. Waiting for the capital investments in the Chardzhou Petroleum Processing Plant to be increased, manager I. A. Aganov is taking on any kind of work just to give his people something to do and to keep the collective together until better times.

The Gaurdakkhimstroy and Marykhimstroy Trusts are undergoing similar difficulties. The construction of major facilities at construction sites at the Gaurdak Sulphur Plant imeni 50th Anniversary of the TuSSR and the Turkmen Nitrogen Fertilizer Plant is being completed, and both collectives are unsure about their immediate future.

In the current year, the chemical facility builders of Mari will concentrate their efforts on the social and industrial construction sites in Mari. But what is Gaurdakkhimstroy engaged in? After all, there is no sense in dissolving a trust if 12 months later it is to be reformed...

The resolution on capital construction calls for customers to provide contractors with clear assignments with uniform distribution of the capital investment limits by years. This is justified.

WHY TRUSTS ARE BROKEN UP. Such negative phenomena as liquidation of some and creation of other trusts and personnel reshuffling are often determined by miscalculations in the management of capital construction. The TuSSR Minstroy, of course, changes things from time to time in its structural management schemes. However, the transformations which are undertaken bear a notably expedient character.

They started talking, for example, about the Bezmein Carpet Combine. The thought of a Turkmenzapstroy trust-site was suggested. It became necessary to submit the TZAU [not further expanded], and the decision was made to create Marykhimstroy. And so forth. Usually, however, the groundwork is laid for successful activity of the new collectives. They are supplied with resources, a production base, etc.

The truth is so banal that it is almost embarrassing to talk about it. But evidently it must be repeated. Without a base, the organized Turkmenzapstroy and certain other subdivisions will not fulfill their plans from the very first day of their creation. The Monolitstroy Administration will evidently have to be returned to the fold of Turkmentsentroy. It is therefore no accident that Marykhimstroy is merged with Marystroy.

Practical experience refutes the version that it is easier to manage small organizations than large ones. Many lessons have been learned in this regard. Let us recall, for example, how in Ashkhabad the Turkmenpetsstroy, Spetsstroyemkhanizatsiya and Turkmenstroytrans Trusts arose under the standard of specialization and concentration. There were plans to collect earth digging and lifting technology and transport under a single management for the purpose of better utilizing them. However, in order to accomplish this it was first

necessary to de-consolidate and take mechanisms and machines away from general construction trusts. These found themselves in a difficult position. Secondly, due to the weakness of their repair bases, the SUMRs [specialized administration on mechanized work] and PMK [mobile mechanized columns] were unable to improve the efficiency factor of their technology. Thus, "concentration" turned out to be a dispersion of efforts and resources.

In accordance with the resolution by the party and the government which states that "the trust must be provided with the necessary means of mechanization and transport," the ministry has added detachments of mechanics to the Tashauzstroy and Turkmenvostokneftestroy Trusts. However, it is still a bit early to maintain that everything possible has already been done in improving the management of capital construction.

**EMERGENCY BEFORE START-UP.** Let us imagine the following situation. The annual plan has not been fulfilled. The SMU chief shrugs his shoulders and blames it on objective reasons. They believe him. But an experiment was performed at one trust. A contractor who did not meet his tasks was given everything he asked for. Nevertheless, the plan was still not fulfilled, and obviously, the un-businesslike qualities of the unfortunate manager became clear to all. It is specifically building production which has not been properly organized along its entire chain that hinders defining the true value of the economic manager.

However, there is also another point of view, in which the criterion for evaluation of a worker is his ability to overcome difficulties. They think that if he has everything he needs, even a weak manager will be able to handle his assignment, but just try to "make" the plan without materials or personnel...

Nevertheless, the essence of the infamous "ability" is well known. Often it is expressed in disruptions of funds discipline and development of capital. At the same time, the emergency work by all hands declared at the construction sites is presented as a concentration of resources at start-up facilities.

In order to bring the first phase of TZAU on line, subdivisions of all the trusts within the TuSSR Ministry of Construction without exception were gathered at the construction site and aid was requested from tens of installation brigades within the USSR Minmontazhspetsstroy [Ministry of Installation and Special Construction Work]. The same story was repeated at the Bezmei Rug Plant and the Ashkhabad Circus...

The argument is the same: the capacities must be introduced into operation, but there are not enough forces. The analysis usually goes no farther than this. However, let us clarify this. The official figure for the shortage of workers--almost 1,500 people--would correspond to the actual situation if the Minstroy collectives fulfilled their task on growth of labor productivity. However, since it is chronically underfulfilled, this figure should be doubled.

Thousands of man-days, which turn into months and years, are lost due to disruption of labor discipline and idle times at construction sites in the republic. This time is lost due to non-uniform assimilation of capital investment. All this is what the brigades and construction-installation administrations who

are called in to attack the "bearded" facilities are trying to overcome. What does concentration have to do with all this? It is reasonable to call this a consequence of not knowing how to organize rhythmic and stable work at the sites?

IMPRISONED BY HABIT. Emergency all-hands work is hardly acceptable as the only method for submitting plants and factories, housing and schools for operation. The cost of the imaginary concentration is too great. The facilities grow more expensive before our very eyes. In 1984 the TuSSR Ministry exceeded the cost of construction-installation work, allowed losses, and the growth in wages significantly outstripped the growth in labor productivity. Obviously, extensive factors had to be used, but even these were unable to ensure timely submission of numerous facilities.

Isn't it time to create such conditions at the construction sites which would eliminate the need for overcoming these difficulties: to strengthen discipline, to introduce scientific organization of labor, and to reject voluntarism in management?

Within Ministry, Turkmenorgtekhstroy, which numbers 90 people, is working toward a well-founded engineering preparation and normal organization of production. Ten other major trusts have special groups and sections with an annual wage fund of 540,000 rubles. However, they do not always justify their daily bread. The efficiency of work production projects and organization of construction and grid schedules is weak. They are either not used at all or are corrected.

What has happened, for example, at the construction sites of the Turkmen Nitrogen Fertilizer Plant? Yaroslav engineers and organizational-technical building specialists proposed a work production project to Marykhimstroy which was aimed at the operational introduction of TZAU in 1982. The actual start-up date was in 1984, and this not even to full capacity. The project was altered and refigured, but it still did not give the desired effect.

The schedules proposed by the Turkmenorgtekhstroy Trust to the builders of the Bezmein Carpet Combine and the Ashkhabad Circus remained on paper in just the same way. Their ultimate goal--to introduce the facilities into operation on schedule--was not achieved. Is the problem here one of conservatism alone? It is true that some have still not rejected the habit of working in the old manner and in relying on outside help. This, after all, is easier than exerting one's own efforts and skills. However, the main reason, in our opinion, is hidden in the unsatisfactory management of the construction sites, which is being performed by the "Trishka's caftan" method. The obvious lack of consideration for the ruble is also evident.

Wherever the people's money is considered, wherever they understand that expensive emergency all-hands work dips primarily into the state's pocket, there innovations are readily introduced, as for example the installation of houses by hourly schedule, schedules of labor and material expenditures, and the open contract order were introduced at the Chardzhou Large-Panel House Building Trust.

12322

CSO: 1821/117



COSPLAN OFFICIAL ON INDUSTRIAL CONSTRUCTION GOALS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Jan 85 p 2

[Article by L. Bibin, assistant chairman of Gosplan: "Starting Objectives--into Operation"]

[Text] The multimillion-strong army of builders has received a new program of operations for the concluding year of the 11th Five-Year Plan. The collectives of construction and assembly organizations must make greater gains than in the past year. The commissioning of basic production funds is increasing by over seven percent and will reach a volume of more than 146 billion rubles. An important position in the plan is set aside for the solution of social problems, and first of all for the further improvement of housing and living conditions and medical service for workers. Housing should be constructed with a total area of 114 million square meters--11 million more than was stipulated in the five-year plan quota for the last year.

The new program of construction-assembly operations has been put together with regard for the well-known resolution of the CPSU Central Committee and the USSR Council of Ministers "On improving the planning, organization and control of capital construction", as well as for the necessity of ensuring the fulfillment of the food and energy programs, increasing the efficiency of social production and accelerating scientific and technical progress.

How are these requirements realized in the plan? First of all it has been stipulated that a high concentration of efforts and means--84 percent of the total volume of construction-assembly operations--be put toward 1985-86 starting objectives. The volumes in retooling and reconstruction of operational enterprises are significantly increasing. More than 30 billion rubles are being directed toward these goals, which significantly exceeds the five-year plan quota.

High rates of development have been planned for the base industries. With a 5.5 percent increase over last year in capital investments in industry as a whole, they will grow by 14 percent in the fuel-energy complex, by 16 percent in ferrous and non-ferrous metallurgy, and by 15 percent in machine building.

Consequently, the Energy Program is being realized. A 12.7 million kilowatt total increase capabilities is planned. In this, as in previous years, a great deal of attention is devoted to the development of atomic energy; the commissioning of the next power units is projected at the Smolensk, Balakovskiy, Zaporozhye and Kurskiy AES [Atomic Power Station]. The first units will be commissioned at the Perm and Berezovskiy GRES [State Rayon Power Station].

Great tasks stand before builders in realizing the starting program in the oil and gas industry. They must put into operation more than 3,000 kilometers of mainline pipeline for oil and petroleum products. Among them are the 963 kilometer Kholmogory--Klin (first) and 333 kilometer Saratov--Kuzmichin oil pipelines and the 285 kilometer Voronezh--Belgorod, 187 kilometer Petropavlovsk--Kokchetav--Tselinograd and 158 kilometer Travniki--Kustanay--Amankaragay petroleum products pipelines. The length of mainline gas pipelines and taps from them should increase by more than 9,000 kilometers. It remains to complete the construction of the second phase of the Urengoy--Tsentral gas pipeline, with a length of 3,112 kilometers, the 512 kilometer Kursk--Kiev gas pipeline, the 755 kilometer Urengoy--Surgut condensate pipeline and others. The commissioning of large gas-processing capabilities at the Orenburgskiy helium and Mubarekskiy gas-processing plants is also stipulated.

The construction and commissioning of capabilities in the coal industry will be carried out at accelerated rates. The commissioning of mines and pits with a total capability of over 35 million tons is projected, including almost 7 million tons resulting from reconstruction and retooling. In this, almost 80 percent of the growth of capabilities is planned for pits, which guarantees a reduction in the specific cost estimate per ton of production of more than two-fold. Capabilities should be put into operation at the following pits: Vostochnyy in the Pavlodar Oblast, Pavlovskiy No 1 in the Maritime Krai, Berezovskiy in the Krasnoyarsk Krai and Neryungrinskiy in the Yakut ASSR. Reconstruction should be carried out and growth of capabilities ensured at the Angrenskiy and Tal-Oryakh pits in the Tashkent and Magadansk oblasts respectively, and at the Komsomolets mine in the Kemerovo Oblast, the Aktasskaya mine in the Karagandin Oblast and others.

Virtually all industries are being reinforced with new capabilities: ferrous and non-ferrous metallurgy, machine building and the machine-tool industry, the chemistry and production of mineral fertilizers, cellulose-paper and woodworking industry, light industry and the food industry, and transport and communications.

In all the builders must commission more than 1,500 industrial capabilities according to the quotas of the state plan for economic and social development. In this, as in previous years, for various reasons, among which the primary ones are an insufficient construction back-log and difficulties with the assembly of equipment, it was not possible to plan a uniform turning over of objectives in the course of the year. The second half of the year, when more than two thirds of the new capabilities will have to be commissioned, remains intense.

This obliges the development, ahead of time, in each contracting organization of corresponding measures that would guarantee the successful completion of the construction five-year plan. This is precisely where the efforts of builders are directed by the proposals of comrade K. U. Chernenko, concerned with strengthening the material-technical base, further industrializing construction and giving aid in its development.

Additional material resources, machines and mechanisms are directed to construction sites. A great deal of attention is being devoted to building up the capabilities of construction organizations and their production base, and to re-equipping

construction industry enterprises. In the plan 4.4 billion rubles are stipulated for these goals. In the next year construction-assembly organizations will receive 8,800 single-bucket excavators, 6,600 bulldozers, 6,000 truck cranes, 1,700 tower cranes and 21,000 other assembly cranes.

All this establishes favorable preconditions for the fundamental improvement of operations at construction sites. However, it should be noted that the means being given to the construction ministries are not being used efficiently enough. Construction times for objectives of their own production base are delayed and in a number of cases the cost is raised considerably; newly commissioned capabilities are assimilated slowly. The utilization factor for production equipment remains low at construction industry enterprises. Large reserves are also hidden in improving the utilization of equipment existing on site. Now the average daily operation of machines does not exceed 10-12 hours. Thus, besides renovating the fleet of construction equipment, the contracting ministries must take active measures to increase shift work, reduce whole-shift and partial-shift idle time and improve repairs and the organization of operation for construction machines.

One of the most important problems in the workability of capital construction plans is the balance of volumes of work and material-technical resources. Construction organizations and construction industry enterprises should sharply activize work on developing and carrying out complexes of measures that ensure a reduction in the consumption of sheet metal, cement, lumber, pipe, and other types of resources.

Growth in the volume of construction-assembly operations should come about primarily as a result of increased labor productivity. For 1985, the task in terms of this indicator has been set at 3.5 for construction as a whole, and for the basic construction ministries it is at the level of 4.2-4.5 percent. Higher rates of reducing the cost of construction-assembly operations are stipulated.

In compliance with the tasks for the development of science and technology, in the next year production volumes and the introduction in construction of advanced types of construction and materials are sharply increasing, and leading methods of organization and technology of construction production will be widely used. The utilization of such advanced methods of organization and technology of construction production as the unit-block and assembly method, the watch method of introducing operations, conveyor assembly and large-block assembly of the roofs of industrial buildings and others will be expanded.

In the concluding year of the five-year plan construction will begin on 35 experimental objectives, at which will be checked the new volume-planning and constructive resolutions, which ensure the application of efficient engineering and production equipment for the various industries of the national economy. According to the calculations of USSR Gosstroy, the realization of the tasks set by the plan in the development of construction science and technology will ensure a significant economic effect and a reduction in the number of workers.

In compliance with the resolution of the CPSU Central Committee and the USSR Council of Ministers "On improving planning, organization and control of capital construction", construction-assembly trusts should be consolidated as a basic

self-supporting link, and their responsibility for the timely completion and commissioning of construction objectives should be increased. At the same time general, authority and territorial schemes of control will be developed.

The realization of such a wide range of advanced technical and organizational measures, covering all sides of the operation of construction organizations, and the additional distribution to them of material resources and equipment inspire confidence that the starting program of the last year of the five-year plan will be successfully carried out.

12461

CSO: 1821/053



CAPACITY, EQUIPMENT OF NEW BRICK-MAKING PLANT VIEWED

Moscow STROITEL'NAYA GAZETA in Russian 9 Dec 84 p 1

[Article by V. Perzashkevich, Minsk Oblast, in the column "Underway Today--Sites of the Construction Industry": "The Gayduk Clay-Brick Plant"]

[Text] The construction project's description:

Designation: the first line of a highly mechanized clay-brick plant.

Capacity: 75 million bricks per year.

General contractor: the Order of Lenin Production Construction and Installing Association, Minskpromstroy [Minsk Industrial Construction Association] imeni 60-letiya Velikogo Oktyabrya.

The start of construction: May 1982.

Period of introduction: the fourth quarter of 1984.

The first department, which should yield output at the end of the year, is the first line of the brick plant. Installation of the equipment is being completed here. It is difficult to blend even the appearance of the installed units in with ordinary notions about brick production. For example, the high-capacity tunnel kiln, which is almost 150 meters long, 8 meters wide and about 5 meters high, reminds one of a factory building. Dozens of finished kiln carts of 10,000-brick capacity each are inside it. This is almost 4-fold the number of units that are ordinarily used at existing enterprises. In all, 360 such carts will be used for drying and baking bricks.

But it is, of course, not just a matter of size. The main feature of the future plant (to be put completely into operation in 1985) is that automation will control the whole production cycle. Beginning with the receiving department, where the raw material arrives, to dispatch of the finished product to the warehouse in palletized form--250 bricks per pallet.

Small-size bricks of special strength--grades 250-300, with 40-percent hollowness--will be produced at the plant. In other words, a high-quality building material, from which high-rise housing with footings less thick than current ones can be erected. And this is a saving of concrete, metal and, of course, labor.

A Word by Plant Director V. Bagretsov:

"The place for the enterprise was chosen successfully, in our opinion: 10 km to a quarry with an adequate reserve of high-quality clay. A special route has been laid out here that bypasses communities, so that the dense flow of high-capacity trucks will not create excessive noise and will not pollute the air. A convenient microrayon has been laid out and is under construction.

"The builders took up a good pace from the first days of the plant's erection. At the end of 1982 they had assimilated 1.3 million rubles of capital investment instead of the planned 700,000 rubles. The task was also overfulfilled the next year. Nowadays the pace is somewhat slower, since the erection of the most complicated equipment is in process, work that requires special precision. The builders and installers have not encountered this before. But, judging by the people's spirit, they will cope with the job."

A Word by Deputy Minskpromstroy Association Chief A. Yermak:

"The facility is, of course, unique. And time and again problems have arisen before us that we had not solved before.

"The main work, which was to be done in the main building, was that of laying concrete footings and foundations under the various items of equipment, the conduits for the cables and transporters, and so on. And all this is to be made of poured concrete. In considering the specifics, they counted on truck-borne concrete pumps. And, so they would not be idle, a concrete plant was established at the site. Nowadays the lag behind the schedule is not connected with the start of erection of the equipment by chance. We have never had to do anything like this before, especially in erecting the baking kilns. But the essence of the matter is not just this and not so much this. On arriving at the job, neither we nor the subcontractor had a complete idea of what awaited us: there was not enough design and budget-estimating documentation for 3 million rubles. The chief harm came from this."

A Word by Chief Engineer of the SU [Construction Administration] of Teplomontazh [Heat-Engineering Equipment Installing Trust] N. Kalugin:

"Complexities also arose with lining the carts. Or, to say it more simply, with lining them from the inside with refractories. According to the technology, these refractories (the capital's porcelain-ware plant and Minskstroy-materialy [Minsk Building-Materials Association] delivered them to us) should be of strictly defined sizes, deviations from the dimension to be no more than 2 mm. As a matter of fact, the articles turned out to be 2.5-fold to 5-fold less in both diameter and height. Why? Because achieving the needed precision was extremely complicated, given the technology that existed at both enterprises. Instead of seeking a way out of the situation that had been created, USSR Minstroyaterialov [Ministry of Construction Materials Industry] and the industry's scientific-research institutes sanctioned the output of poor-quality products. It was too late to refuse them: deadlines were passing. And so we ourselves had to bring the suppliers' product up to the required dimensions manually: to smooth out the surface, to grind and to grade. During these difficult days, people helped us, both the client and the general contractor. The assistance made it possible to organize work around the clock, and we began to overcome the lag."

#### Our Correspondent's Commentary:

And so today the main difficulties of this most important construction project are behind. True, the epic work of installing the kilns and the cart linings led to a delay at the auxiliary facilities--the purification structures, the utility and service lines, and so on. But here it is far easier to rectify the situation: the construction project's management has a good potential for shifting people's workplaces and for manipulating material resources. In particular, building up the land's amenities is going on ahead of schedule. The receiving, preparation and drying departments and the charging-materials yard have been turned over for putting into shape. The way has been completely paved for the plant to be able to start production in the next few days.

In general, timely startup of the enterprise's first line no longer provokes doubts. Right now the raw material for the bricks has been obtained here. But still, the serious confusion about installation of the equipment that arose when the first line was erected should serve as a clear lesson for the future, for clients and all construction participants. For next year the enterprise's second line, which is to have the same capacity, should be turned over for operation.

11409

CSO: 1821/070

RETROSPECTIVE RESIDENTIAL HOUSING CONSTRUCTION DATA VIEWED

Moscow VESTNIK STATISTIKI in Russian No 9, Sep 84 pp 58-62

[Article and statistical tables under the rubric "In Aid of the Agitator and Propagandist": "I. The Right to Housing"]

[Text] Citizens of the USSR have the right to housing. This right is ensured by developing and safeguarding the state and public housing supply, assistance to cooperative and individual housing construction, the just distribution of housing floor space under public control which is granted in the degree to which the program for building comfortable housing is implemented, and also by low payments for apartments and communal services. Citizens of the USSR should treat the housing that is given to them with care.

The USSR Constitution, Article 44.

The general (usable) floor space in housing units put into use during all the years of Soviet power (1918-1983) amounts to 3,834.8 million square meters, including 2,311.5 million square meters by state and cooperative enterprises and organizations and housing cooperatives, 1,447.6 million square meters inhabited by the people at their own expense or with the aid of government credit, and 75.7 million square meters by kolkhozes.

Now, in less than a month, new housing is built that would be sufficient for a city with a population of 500,000 people. On the average more housing is put into use in two years than in all the pre-war five-year plans put together.

The primary portion of housing construction is built by means of state capital investments.



Housing Units Put Into Use (Millions of Square Meters of Total (Usable) Floor Space)					
	Total Built	By State and Cooperative Enterprises and Organ- izations and Housing Cooperatives	Of those, Housing Coop- eratives	By the Population at Their Own Expense and With the Aid Of State Credit	By Kolkhozes
1918-1940 including the 1st half of 1941.	408.9	127.9	--	281.0	--
In particular, 1940)	24.5	9.6	--	14.9	--
The 6th Five-Year Plan (1956-1960).....	474.1	224.0	--	250.1	--
In particular, 1960.	109.6	55.8	--	53.8	--
The 7th Five-Year Plan (1961-1965).....	490.6	300.4	13.4	184.9	5.3
In particular, 1965.	97.6	63.2	6.5	33.0	1.4
The 8th Five-Year Plan (1966-1970).....	518.5	352.5	33.6	153.8	12.2
In particular, 1970.	106.0	76.6	7.7	26.7	2.7
The 9th Five-Year Plan (1971-1975)	544.8	407.3	32.6	120.8	16.7
In particular, 1975.	109.9	83.3	5.8	22.6	4.0
The 10th Five-Year Plan (1976-1980).....	527.3	413.8	27.4	91.4	22.1
In particular, 1980.	105.0	84.0	5.1	16.1	4.9
The three years of the 11th Five-Year Plan (1981-1983).....	326.7	258.9	17.7	48.4	19.4
1981.....	106.4	84.5	5.3	16.2	5.7
1982.....	107.9	85.6	5.5	16.0	6.3
1983.....	112.4	88.8	6.7	16.2	7.4

Housing Construction Built By Means of State Capital Investments		
	Total Housing Units Built, Million Square Meters of General (Usable) Floor Space	Capital Investments In Housing Construction (In Comparison Prices), in Billions of Rubles
The 6th Five-Year Plan.....	222.7	27.3
In particular, 1960.....	55.4	6.6
The 7th Five-Year Plan.....	284.5	33.4
In particular, 1965.....	56.2	7.0
The 8th Five-Year Plan.....	313.5	45.0
In particular, 1970.....	67.8	10.2
The 9th Five-Year Plan.....	368.7	58.6
In particular, 1975.....	76.2	12.7
The 10th Five-Year Plan.....	380.5	68.0
In particular, 1980.....	77.7	14.2
The three years of the 11th Five-Year Plan	237.9	47.6
1981.....	78.2	15.1
1982.....	79.0	15.9
1983.....	80.7	16.6

Housing construction requires huge capital investments, material resources and technical means from the Soviet State. Expenditures to build a three-room apartment in modern housing units in the center of the country amount to 9,000 to 10,000 rubles. In cities in the Far North and other remote regions they are higher by a factor of two to three.

During the modern phase special attention is being given to housing, cultural and everyday construction in the village which will serve as one of the most important trends in solving the largest social problem--overcoming the existing differences between the city and the country.

During the years from 1971 to 1983, 413.1 million square meters of general (usable) floor space were put into use in rural locations which is almost equal to the entire urban housing supply in the country in 1940.

During the 11th Five-Year Plan housing units with a total floor space of no less than 176 million square meters should be built in the village and during the 12th Five-Year Plan it will be 15 to 18 percent greater.

Almost two-thirds of individual housing units are built in rural locations. After joining a rural housing construction cooperative a future owner of a house pays 30 percent of its cost (often with the aid of the kolkhoz.) The State bank gives credit for the remaining sum. Often the state takes more than a third of the cost of the house upon itself.

Number of Apartments Built and Their General (Usable) Floor Space						
	Total Apartments Built, Thousands	In Particular			General (Usable) Floor Space in All Apart- ments, Millions of Square Meters	Average Size of Apartments Built By State and Cooperative Enterprises and Organ- izations, Kolkhozes & the People, Sq. Meters
		By State & Cooperative Enterprises and Organ- izations and Housing Co-ops	By the People at Their Own Expense And With the Aid of State Credit	By Kolkhozes		
The 6th Five-Year Plan	11,292	5,126	6,166	--	474.1	42.0
In particular, 1960.	2,591	1,331	1,260	--	109.6	42.3
The 7th Five-Year Plan	11,551	7,319	4,139	93	490.6	42.5
In particular, 1965.	2,227	1,511	691	25	97.6	43.8
The 8th Five-Year Plan	11,333	8,141	2,975	217	518.5	45.8
In particular, 1970.	2,266	1,723	489	54	106.0	46.8
The 9th Five-Year Plan	11,224	8,859	2,050	315	544.8	48.5
In particular, 1975.	2,228	1,778	377	73	109.9	49.3
The 10th Five-Year Plan	10,241	8,388	1,448	405	527.3	51.5
In particular, 1980.	2,004	1,667	247	90	105.0	52.3
The 3 years of the 11th Five-Year Plan	6,029	4,972	728	329	326.7	54.2
1981.....	1,997	1,646	250	101	106.4	53.3
1982.....	2,002	1,651	243	108	107.9	53.9
1983.....	2,030	1,675	235	120	112.4	55.4
						43.7
						41.9
						41.1
						41.8
						43.3
						44.5
						46.0
						46.8
						49.4
						50.4
						52.1
						51.3
						51.9
						53.0

The years of the 11th Five-Year Plan were characterized by an annual increase in the housing floor space that was put into use. In 1983 more apartments were built than in any of the last five years. Together with accomplishing the large scale of housing construction its quality is improving. More than one half of the housing units that were put into use by means of state capital investments were built according to new typical designs that specify an improved layout for the apartments and much comfort. The average size of apartments is increasing. As a result of unabated attention by the party and government the goals for the 11th Five-Year Plan for putting housing units into use are not only being met but are being exceeded. Over the four years of the five-year plan an additional 9 billion rubles of capital investments were procured above the five-year plan and allocated toward housing and communal construction.

The role of housing construction cooperatives in further improving the living conditions of the population is increasing. The possibilities for building individual housing units, especially in small cities, urban-type settlements and in rural locations are expanding. Workers are rendered assistance in cooperative and individual housing construction by means of incentive funds at associations and enterprises. The initial payment is reduced from 30 to 40 percent down to 20 to 30 percent of the cost of the apartment for members of housing construction cooperatives. The timeframe for retiring the state credit that has been granted was increased to 25 years while other privileges have been established for certain groups of the population.

In 1983, 21 percent more housing was put into use by housing construction cooperations than in 1982. It is intended that the amount of cooperative housing units that are put into use in 1984 increase to 8.4 million square meters which exceeds the goal for the current year of the five-year plan by 20 percent.

In 1983, 16.2 million square meters of housing were built by the population at their own expense and with the aid of state credit including 5.7 million square meters in urban settlements and 10.5 million square meters in rural locations. In 1984 it is intended that individual housing construction increase to 17.5 million square meters which is 11.5 percent greater than in comparison with the five-year plan for this year.



Number of People Who Improved Their Living Conditions (Millions of People)			
	Number of People Who Obtained Housing Floor Space or Built Their Own Apartments	Of Those	
		Obtained Housing Floor Space Or Built Their Own Apartments in New Housing Units	Obtained or Expanded Their Housing Floor Space in Previously Built Housing Units
The 6th Five-Year Plan..	54.0	41.7	12.3
In particular, 1960...	12.0	9.6	2.4
The 7th Five-Year Plan..	54.6	42.7	11.9
In particular, 1965...	10.8	8.2	2.6
The 8th Five-Year Plan..	54.9	42.1	12.8
In particular, 1970...	11.2	8.4	2.8
The 9th Five-Year Plan..	56.1	41.5	14.6
In particular, 1975...	11.0	8.2	2.8
The 10th Five-Year Plan.	51.0	37.2	13.8
In particular, 1980...	9.9	7.1	2.8
The three years of the 11th Five-Year Plan.....	29.9	21.4	8.5
1981.....	9.9	7.1	2.8
1982.....	9.9	7.1	2.8
1983.....	10.1	7.2	2.9

Total (Usable) Floor Space in the Urban Housing Supply (At the End of the Year)						
	1940	1960	1970	1975	1980	1983
General (usable) floor space in the urban housing supply:						
tot. in million sq. meters	421	958	1,542	1,875	2,202	2,417
average per urban resident square meters.....	6.5	8.9	11.2	12.2	13.1	13.7

At present about 80 percent of the urban population lives in individual apartments.

Improvements in the Collectivized Urban Housing Supply						
	1970	1975	1980	1981	1982	1983
The number of cities having:						
A water supply.....	1,787	1,938	2,041	2,070	2,084	2,101
A sewer system.....	1,283	1,491	1,647	1,681	1,717	1,746
The relative weight of housing floor space in the collectivized urban housing supply that are equipped with (in percent):						
A water system.....	78.9	85.0	89.9	90.3	90.4	90.8
A sewer system.....	75.8	82.3	87.9	88.4	88.1	88.7
Central heating.....	73.6	80.9	86.6	87.3	87.1	87.9
Gas.....	64.6	74.7	79.4	79.4	78.6	78.5
Hot water supply.....	33.8	45.7	57.2	58.7	64.9	67.8
Bathrooms.....	60.7	71.7	80.8	80.9	80.7	81.7

USSR Housing Supply (At the End of the Year; Millions of Square Meters Of General (Usable) Housing Floor Space)				
	1980	1981	1982	1983
The entire housing supply.....	3,572	3,666	3,776	3,878
In particular:				
Collectivized.....	1,969	2,050	2,158	2,246
The personal property of a citizen.....	1,603	1,616	1,618	1,632
Of the sum total of the housing supply:				
The urban housing supply.....	2,202	2,272	2,343	2,417
In particular:				
Collectivized.....	1,655	1,717	1,783	1,850
The personal property of a citizen.....	547	555	560	567
The rural housing supply.....	1,370	1,394	1,433	1,461
In particular:				
Collectivized.....	314	333	375	396
the personal property of a citizen.....	1,056	1,061	1,058	1,065

About 2 million new and well-equipped apartments have been built in the Soviet Union each year for quarter of a century--almost double the number in the FRG, France, Great Britain and Italy combined. Free apartments and extraordinarily low rents for them really gives each family, irrespective of their social standing and the income of its members, the right to use comfortable housing. Apartment rents have remained unchanged in the USSR since 1928 and amount to 3 percent, on the average, of all the expenses of blue and white collar worker families including municipal services.

The proportion of apartment rent, including municipal services, of the total expenses of families in capitalist countries is substantially higher. For example, in the USA and Great Britain it amounts to approximately one-fifth of the total family expenses.

In capitalist countries apartment rents are continually increasing. During 1981 to 1983 alone they increased by 36 percent in Great Britain, 60 percent in Italy, 33 percent in Canada, 24 percent in the USA, 15 percent in the FRG and 36 percent in France.

In the USA the high cost of new housing makes it practically unattainable for six out of seven of Americans. More than 2 million people in the country are without homes. Due to their high cost more than 6 million apartments remained unoccupied in 1979.

More than one half of the housing supply in Great Britain was built before 1944. More than 2 million inhabitants of worker apartments are deprived of basic conveniences.

Based on official data, more than a quarter of a million people are without homes in the FRG. The number who are living in shanties and huts is approaching 2 million.

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9495

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HOUSING CONSTRUCTION

UDC 711.437.728.61

SWITCH TO SINGLE FAMILY RURAL HOMES DISCUSSED

Moscow ZHILISHCHNOYE STROITEL'STVO in Russian No 10, Oct 84 pp 4-6

[Article by V. M. Stern, candidate of economic sciences in Moscow, : "Methods for Forming a Living Environment in Rural Settlements; After the Example of the Moscow Oblast", under the rubric "Rural Construction"]

[Text] The socio-economic development of the village has acquired new impetus in connection with the maintenance and drawing into the area of production and servicing of the small settlements and villages (which were previously referred to as "unpromising"), of orientations toward the development of a farmstead-type housing development, with plots of land hard by the flats, and a substantial increase in the volumes of capital investments into the village's social sector. These measures are being carried out as a component part of the USSR's Food Program, and are conducive to the formation of stable labor collectives in the sovkhozes and kolkhozes. Moreover, this transition to the farmstead-type development allows for broadening in the volume of production of the LPKh's [personal subsidiary plots] of the kolkhoz workers, laborers and office workers.

The program planned by the party for further economic and social development of villages also predetermines the planning tasks. In particular, the plans for rebuilding these rural population centers should reflect the dynamics of population growth and the increase of housing (using small villages), progressive methods of organizing the living environment, taking the matter of the population's social aspirations into consideration, as well as the most favorable conditions for tending personal subsidiary plots and the expansion of cooperative and individual residential construction.

A considerable amount of experience has been gained in the Moscow Oblast, where rural population centers are being comprehensively rebuilt under the guidance of local party and soviet agencies. The established material and technical base for rural construction is being reoriented toward production of farmstead-type housing developments within the Glavmosoblstroy [Main Moscow Oblast Construction Administration] and Glavmosoblstroy materialov [Main Moscow Oblast Construction Materials Administration] system. Along with the brick and wood which are traditional for rural residential construction, a number of DSK's [house-building combines] and plants will be producing structures using cellular concrete, arbolite and other effective materials.

A great deal of attention in the oblast is being focussed on the development of rural ZhSK's [housing cooperatives]. This is all the more important if we take into consideration that during the 10th Five-Year Plan period, individual construction accounted for only 4 percent of the overall volume of housing which was built, whereas this indicator amounted to 46 percent during the 7th Five-Year Plan period.

Indicators of the economical nature of planning decisions depend on the siting and organization of production, on its concentration, on the on-farm dispersal of the people, and on the extent to which the interrelated problems of locating the construction projects on the selected territory, and the organization of the territory's layout are economically resolved. In the final analysis, economic effectiveness is determined by the minimal outlay of resources and their rational distribution in time so as to meet the normative town-planning requirements (social standards).

Practically all the centralized farming communities and the majority of the settlements which comprise their productive subdivisions have been provided with planning and layout documents which have been corrected in one way or another. The latter is caused by alterations in productive factors, new sitings and normative planning requirements.

We have selected certain projects which reflect the development of rural housing cooperatives for analysing economic efficiency in architectural and planning resolutions: the central settlements of the "Nara" sovkhos in the Naro-Fominskiy Rayon, of the "Borets" sovkhos, in the Dmitrovskiy Rayon, of the "Dory" sovkhos and the imeni Kirov Lotoshinskiy, the Chekhovskiy Rayon's "Leninskoye Znamya" kolkhoz, and the "Ptichnoye" GPPZ [State Poultry Breeding Farm] in the Naro-Fominskiy Rayon etc.

A full-scale inspection has been conducted in the settlements of the "Nara" and "Borets" sovkhoses, and planning data recommendations are being made for the remainder of the settlements.

The analysis revealed definite omissions in the organization of the layout of the settlements' structures, and has revealed reserves for increasing the economic effectiveness in laying out the housing tracts (development areas) for farmstead-type housing developments for the rural housing cooperatives. The latter are also characteristic of the planning designs used for the Petelinskiy PTF [Poultry Marketing Farm], located in the Odintsovskiy Rayon, and, to a lesser degree, of the settlements of the Kashirskiy Rayon's "Novoselki" sovkhos and the "Zarya Kommunizma" sovkhos, in the Domodedovskiy Rayon.

In all the plans which were considered, block layouts were used, with unilateral or bilateral building up of the subdivided blocks. This gives the construction in progress a low linear density and, consequently, extends the length of the street and service line networks. The traditional method of construction zoning, wherein separate building zones are set apart for siting farmstead-type developments, is not completely convincing.

The uneconomic one-sided building up of blocks is used in the plans of the "Novoselki", "Dory", imeni Kirova and "Borets" sovkhoses, the Petelinskiy Poultry Marketing Farm, and in part in the "Nara" sovkhos. In the latter plan, the rear sides of the plots next to the farmstead houses face the main entrance. In the plan for the Petelinskiy Poultry Marketing Farm settlement, a lined-up row of one-sided development is set facing the rear side of the plots on the other side of the street.

The streets have been widened in the settlements of the "Novoselki" sovkhos (the boulevard within the red lines is 60 m wide, and about 100 m between the lines marking the building up), the "Borets" sovkhos (40 and 60 m, respectively), and the "Nara" sovkhos (50 and 100 m, respectively), the "Leninskoye znanya" kolkhoz (40 and 60 m, respectively). As a result, the area occupied by the street has been considerably enlarged. In a block-type plan, the "in-line" method of development is found to be less economically effective than one or another of the "cluster" methods.

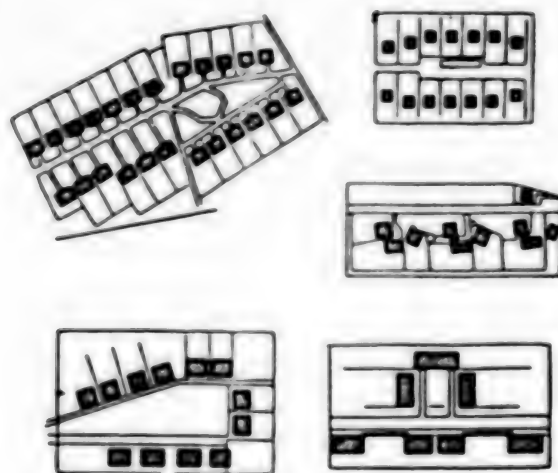


Figure 1. Various methods of closing up farmstead-type and block-type housing developments.

The suggested layout resolutions (Figure 1) illustrate the potential for increasing the linear density of a residential build-up and the opportunity to seek an architectural look for the street through residential development with a low building profile. Among these methods are the consolidation of residential developments through the use of loop streets and cul-de-sacs in the layouts, cluster arrangements, and the juxtaposition of houses of varying dimensions, volumes and plastics for the facades. In order to increase the density of these developments, a determination must be made of the most favorable correlation of the direction faced by the plots and their distance from the street, and a reduction of the width of the streets along the front. This permits a 1.4-1.6-fold reduction in the length of the street network and the area to be paved, as well as the utility networks, calculated for a single dwelling.

The justification for construction zoning methods has critical importance when farmstead-type housing (housing cooperatives) is being sited within the plan of ongoing settlement reconstruction which has already taken place. The separation of these construction developments into "independent" isolated blocks is not always economically or functionally justifiable. The fact of the limited juridical validity of housing cooperatives (for example, the "Druzhba" housing cooperative on the "Nara" sovkhoz, and the "Podosinki" housing cooperative on the "Borets" sovkhoz) is no justification for setting these ongoing construction projects apart in independent fashion. It is more economical to carry out the zoning within the boundaries of established residential groups of sectional houses which have already been provided with all the utilities and services.

As regards function, the proposed "mixed" construction zoning (within the residential groups) has the advantages that housing developments which make different use of the territory, i.e., which have divided their subsidiary plots up with livestock sheds, are being developed adjacent to the existing sectional houses. This permits grouped sheds for the livestock, which are cared for in the LPKh's [wooded areas] by the people who live in the sectional houses, to be placed in the gaps between the sectors (purposely-left access corridors), and also allows the non-farmstead area enclosed by the sectional housing groups to be used for communal get-togethers and leisure and children's games.

With respect to composition, the mixed construction project does not always achieve organic coordination: on the one hand, one perceives a front of sectional construction, and on the other--farmstead houses. What is the justification for this contrast? Indeed, skillful renovation consists in the fact that it allows a combining of forms, the discovery of transitions and stylistic unity through the application of appropriate solutions in the process of construction, by a well-kept external appearance and with greenery. One of the ways by which harmony is achieved is apparently a fluid transition from one of the house types to another, for example by inserting interconnected two-story apartment houses with bi-level apartments (or with one apartment per floor) between the sectional and farmstead-type houses.

The proposals set forth above concerning the architectural merits of mixed groups of houses might be construed as subjective, but it is obviously impossible to deny the fact that the straight-line layout and monotonous planning approaches of construction zoning appear unconvincing in the construction plans.

An analysis of the planning proposals for developing farmstead-type construction in the settlements has led to a number of fundamental proposals for improving the settlements' planning structure under the conditions of their reconstruction. The case in point is one of putting the so-called flexible planning resolutions into practice. At the foundation of these resolutions rests the stipulation that the settlement is in effect a developing system, the parameters of which can undergo one alteration or another.



The norm for an adequate supply of housing is being raised, the number of people belonging to housing cooperatives is growing, the attitude of these or other groups of families toward tending personal subsidiary plots is changing, and the number of people moving to settlements is increasing--and all this must be made to fit organically into the structural frameworks of the village under reconstruction. It is quite important that growth factors cause no excessive changes in the planning structure, in the primary planning resolutions, or give rise to additional capital investments during the reconstruction process. It is precisely the "flexible" planning solutions which are called upon to provide the system's adaptivity to possible ensuing changes.

Adaptivity is not brought about by reserving territory "just in case", but by using appropriate methods for developing and transforming the planning structure of the settlement and its elements. This is brought about, specifically through the formation of a functional belt zone, the development of linear structures, and structures which are developed frontally, radially or focally [ochagovyy] (Figure 2).

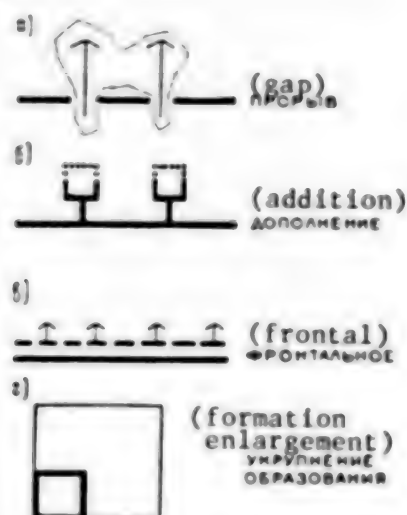


Figure 2. Variations in the formation of "flexible" planning structures

In conditions where the directions for development are limited (by the contour of a wooded area, a main transport route, a river), "windows" should be used, which are made along other unimpeded directions, and are based on the "gap" structure, which allows for development of structural elements and for construction to progress in these directions, said construction to be effectively coordinated with the overall composition of the settlement's planning resolution. It should be mentioned that in a number of settlements (the "Borets", imeni Kirov, the Petelinskiy Poultry Marketing Farm etc.), the "plot-addition" blocks of farmstead-type houses are poorly coordinated with the general composition of these housing projects. These structures have limited potential for further development. Planning proposals and variations are shown in Figure 3.

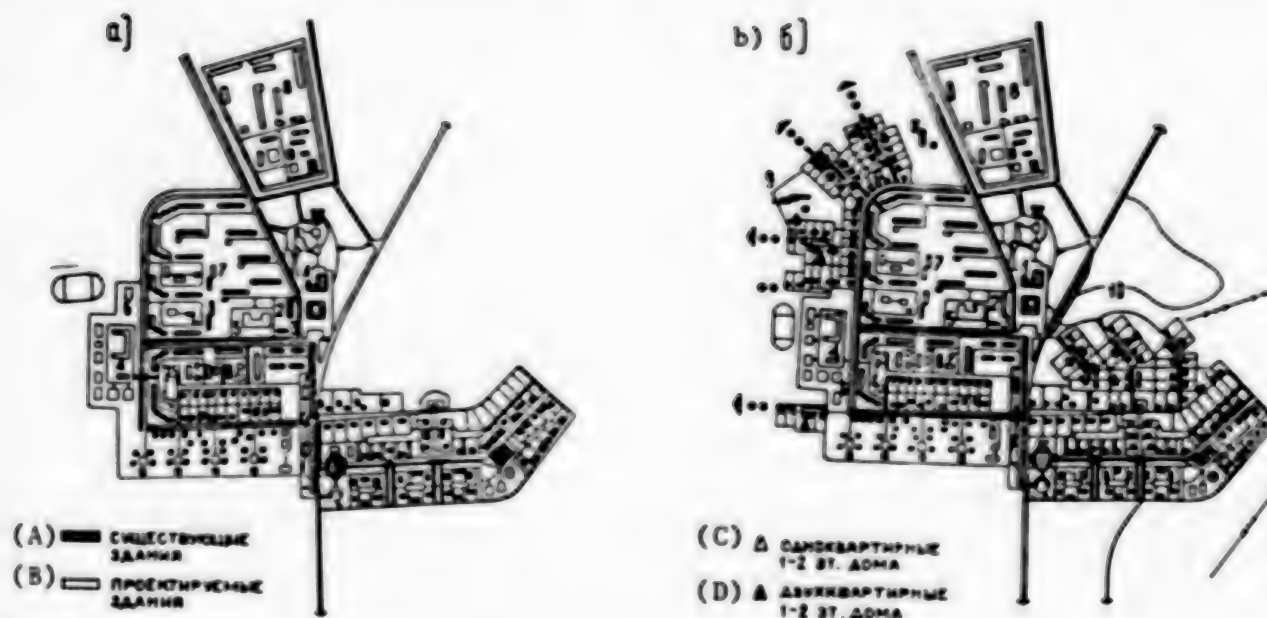


Figure 3. Variations for development of a settlement planning structure, after the "Borets" sovkhos (Dmitrovskiy Rayon).

Key: a--planning proposal; b--alternatives for development; (A)--existing structures; (B)--projected structures; (C)--single-unit, 1-2-story houses; (D)--double-unit 1-2-story houses; 1--club; 2--trade center; 3--main office; 4--school; 5--kindergarten; 6--sports complex; 7--sectional houses; 8--production area; 9--new residential developments, including house-building cooperatives; 10--addition

Settlement reconstruction stipulates that the plan be carried out taking the demand for the housing which has been developed into consideration. For example, the daily maintenance enterprises: children's day nurseries and kindergartens, food stores etc. are not arranged under a single roof, but one after the other, in booths and sectional modular construction. And residential construction itself is handled not as completed clusters of houses, but as a growing development.

In the comprehensive planning of the plots alongside the houses, it is important to provide for (and accordingly, to orient the individual house-building cooperative members and builders) to the opportunity to make use of the so-called "growing" house. Subsequently, the rooms of the house can be expanded in accordance with the plan, as the family grows.

The above also relates to the settlement's engineering utilities and services and the external appearance of the territory, which is planned in coordination with the rates and workload of construction. It relates primarily to the installation of the main heat supply and sewage lines. Thus, in the boiler

rooms, the number of heating appliances increases at about the time loads are introduced, and the sewage purification units are installed as the number of sections increases.

Provision can be made in the plan for the use of simplified (local) engineering utilities systems for single-story houses. These systems can be connected later on to the central settlement networks.

One of the directions for the "diachronic unfolding" could be the planning, at the first stage, of multifunctional use of the service enterprises (the coffee-shop/canteen, the sports hall-movie hall etc.).

The technical and economic indicators should also undergo certain changes. Thus, during the planning of farmstead-type housing developments, each house (apartment) is inseparably linked to its plot, as to a planning module. Here, all importance is lost for the indicator for housing density, which relates to the area where the housing is sited (especially to the net density). In its place, we bring in an indicator for the linear density of the housing development: the amount of houses or apartments falling on each 100 m of the street network. It is upon this very indicator that the proportionate length of the engineering utility supply lines, which are laid along the streets, depends, as well as the area of pavement for the public streets and sidewalks, and the area planted with greenery.

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## TECHNICAL LEVEL OF AVAILABLE CONSTRUCTION MACHINERY

Moscow MEKHAIZATSIYA STROITEL'STVA in Russian No 9, Sep 84 pp 5-7

[Excerpts from article by V. M. Kazarinov and V. I. Polyakov, candidates of technical sciences (TsNIIOMTP) [Central Scientific-Research and Design-Experimental Institute on Organization, Mechanization and Technical Aid to Construction]: "Technical Level of Building Technology and Effectiveness of Work Mechanization"]

[Excerpts] The current technology of construction work, presenting definite requirements for the newly developed and improved engineering, has a decisive influence on the formulation of machine pools. Every year around 50,000 basic construction machines are supplied to construction. The quality and technological level of these machines determine to a significant degree the cost of the work, the labor productivity, the expenditure of energy resources, the working conditions of the service personnel, and consequently also the overall effectiveness of building production.

The industrialization of construction which is associated with an increase in the volume of installed structures and the intensification of work production on the one hand, as well as the increased portion of capital investments for the reconstruction of industrial facilities under cramped conditions and the need for mechanization of small and dispersed jobs on the other determine the need for machines of both large and small unit capacity.

The system of machines for comprehensive mechanization of construction for the period 1981-1985 ratified by the USSR Gosstroy [State Committee on Construction Affairs] and the Minstroydormash [Ministry of Construction, Road and Municipal Machine Building] provides for the proportional development of machines of small and large unit capacity. However, the portion of powerful machines in the overall output is insufficient, and its growth rate is rather low. Thus, the production of high-power excavators is 9 percent, scrapers--4.3 percent, bulldozers--1.3 percent, motor graders--8 percent, boom cranes--1 percent, and tower cranes--7 percent of the overall volume of production for each group of machines. The average capacity of the machines which are being manufactured is increasing insignificantly. For the period of 1980-1985 it increased by approximately 5 percent for excavators, auto and tower cranes, and by 19-25 percent for single-bucket loaders, motor graders, bulldozers and scrapers. By absolute value, the average capacity is still only 10/13 to 5/9 of that required by the machine System.



At the present time there is a need for bulldozers and motor graders with nominal capacity of 800 and 250 horsepower respectively, for pipe layers with load capacity of 80 tons, for caterpillar tread cranes and cranes on special chasses with load capacity of 250-400 tons, for tower cranes with load capacity of 100 tons, and for scrapers with bucket capacity of 25 cubic meters.

In connection with expanded construction under specific regional conditions, machines manufactured in special variants—KhL [not further expanded] and southern—must be developed. As yet the output of special technology is still rather limited and comprises: excavators and bulldozers—2.4 percent each, tower cranes—8 percent instead of the required 12-15 percent of the overall output. There are no plans for modifications of machines adapted to work at high temperatures and a dust-filled environment. The development of KhL machines is inhibited by the insufficient output of complement products.

At small and dispersed construction-installation work sites, including at sites with cramped working conditions, low capacity machines are irreplaceable. These effectively facilitate the elimination of manual labor. The development of such machines as microbulldozers of tow class 0.6-1 ton force, motorized carts and earth digging-transport machines with bucket capacity of 0.1-0.17 cubic meters, handler cranes with load capacity of 1-3 tons, mini-rollers weighing 0.5-2 tons and others will make it possible to more rationally formulate the technological complements of mechanization means and to improve the structure of the machine pool.

Over 30 percent of the wheeled construction machines (cranes, loaders, excavators, bulldozers, drilling machines) are manufactured on the basis of all-purpose trucks, tow trucks and agricultural tractors, and only 1 percent of the self-propelled boom cranes and 7 percent of the overall output of single-bucket loaders are manufactured on a special automobile type chassis with a hinge-articulated frame.

The special chasses, aside from their high speed indicators, ensure an increase in the load and height characteristics, maneuverability, passability, and transportability of the machines which are mounted on them. Additional tow vehicles and trailers (for caterpillar tread cranes) are needed for transporting pneumatic wheel and caterpillar cranes with a speed of 15-20 km/hr. Cranes on special automobile type chasses are self-propelled at speeds of up to 50 km/hr, and with consideration of telescoping boom equipment they provide an overall 6-10-time reduction in repositioning time and a reduction of 124 man-hours as applied to a crane with load capacity of 100 tons. The indicated technological qualities of special chasses may also be realized for excavators, concrete pump trucks with distributing booms, and means of technical servicing. This suggests the economic expediency of organizing the series manufacture of multi-purpose special wheeled chasses, as well as industrial type caterpillar tractors by the automobile industry, tractor and agricultural machine building.

Rubber caterpillar treads are used in small capacity construction machines (bulldozers, transport machines, excavators with bucket capacity of up to 0.25 cubic meters, self-propelled scaffolds, etc.). They have a number of

advantages over steel treads: the weight of the machine is reduced, and consequently the pressure which it exerts on the foundation; jolts and noises are less felt, and the surface is preserved, which is particularly important in work on a technological floor of facilities undergoing reconstruction.

The ergonomic indicators, which significantly affect the technical level of the machines, depend on the characteristics of the base chassis. The noise and vibration levels and gases emitted by new construction machines generally meet health standards. However, there are still a number of machines, which are primarily mounted on tractors, whose ergonomic indicators exceed the health norms.

An important direction in technical progress is the application of automatics in construction machines. Each machine is equipped with the appropriate set of automatic control-measurement and protective devices and apparatus. The technical level of means of automatics is rather high in world practical application. Continuous information supplied to the operator on the degree of load on the machine, automatic all-mode limiting devices for marginal states of operational movement with application of microprocessors and elements of computer technology, and remote and radio control characterize the designs of modern construction machines.

In domestic machines, control systems for technological modes of operation of road machines are being developed (plane stabilizer, layer stabilizer), the laser beam is used for controlling bulldozers and scrapers, electronic technology is used in the preparation of concrete and mortar mixtures, etc. The scientific search continues in the sphere of systems for protecting boom cranes against overloads. Work on preparations for series production of load capacity governing devices for telescopic boom cranes has not yet been completed. Joint efforts of specialists in the sphere of production and operation are required to ensure the reliability of the systems.

The insufficient participation of Minpribor [Ministry of Instrument Making, Automation Equipment and Control Systems] in the development and assimilation of instrument technology in construction machines makes it impossible to improve their technical level in this regard. It is necessary to create special services for maintaining instruments and safety systems in working condition within the building mechanization subsections.

The ministries manufacturing complement products bear almost no responsibility for their reliability and durability on the construction machine, and do not tie in their service life with the service life of the machine as a whole.

The technical level of construction machines must be formulated at the primary stage during development of initial (technical) requirements (TT) for the creation of the given machine model dimension by the primary consumer (customer). The active role of the primary consumer is retained also at the other stages of development and introduction of new building technology. However, this role of the consumer is not sufficiently specified in GOST 15.001-73, in which the list of initial TT is placed in the appendix, and not in the main text. Also, the technical requirements are not regulated as a basic document in the technical documentation for development of the machines.

In a number of cases, new machines are developed not on the basis of the initial TT, but on the basis of those developed by the consumer.

For the purpose of increasing the influence of the consumer in the development of new means of mechanization and in preparation of TT according to a unified example, the USSR Gosstroy has ratified the "Methodological Positions on the Development of Initial Technical Requirements for the Creation of Construction and Road Machines, Mechanized Instruments and Special Motor Transport Means" developed by TsNIIOMTP.

The necessary information on the reliability, durability and repairability of construction machines must be obtained primarily as a result of testing machines of series production under operational conditions. At the present time, according to the plan for comprehensive mechanization and automation of construction-installation work ratified by the USSR Gosstroy, testing of initial batches of new machines is done primarily by TsNIIOMTP with the participation of Dal'NIIS [Far Eastern Scientific-Research Institute on Construction] and SoyuzdornII [State All-Union Road Scientific-Research Institute]. Due to the limited circle of participants in this work, the number of machines tested does not exceed 20-25 percent of their overall output. It is necessary to involve the scientific-research institutes on construction, the VUZ territorial laboratories, and the "Orgtekhstroy" Trusts in this work.

It would be expedient to organize departmental or interdepartmental machine-testing stations such as those at the Moldavian SSR Minavtodor [Ministry of Highways] and the USSR Minsel'khoz [Ministry of Agriculture] under the USSR Gosstroy.

To a large degree, the system of evaluation and certification of construction machines which is headed by representatives of the primary consumer determines the quality of the manufactured product. The methodological standard document used for evaluating the technical level and quality of construction machines is RD 22-2-78, which was developed by the VNIIshtroydormash and the TsNIIOMTP in 1978. However, the effective statute, nomenclature of indicators and selection of machine-analogs does not fully correspond to current increased requirements for certification to the highest category of quality.

The expanded application of machines with high unit capacity, cranes on special automobile type chasses, specialized transport means, concrete mixing trucks, etc. requires the organization of their operation according to a dispatch schedule ensuring a high degree of utilization. It is expedient to concentrate heavy machines within special mechanization subsections and associations such as Soyuztyazhtrans. Increasing the number of special machines and equipment (pneumatic punches, hydro-vacuuming installations, concrete pump trucks, etc.), as well as expanding the application of the automatics system requires the development of specialized subsections for the application of these systems.

Further improvements in building technology will facilitate the increased effectiveness of mechanization and scientific-technical progress in the sphere of building production.

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MODERNIZED MANUFACTURING TECHNOLOGY AT ZLATOUST

Moscow STROITEL'NAYA GAZETA in Russian 27 Feb 85 p 3

[Article by V. Rozhkov, engineer of Orgtekhstroy [State Trust for the Industrialization of Construction] of Glavyuzhuralstroy [Main Administration for Construction in the South Urals Region] (Zlatoust, Chelyabinsk Oblast): "Nonstandard Rebuilding"]

[Text] A facility for producing wall and skylight window casements of a new series for industrial buildings is being readied at the Zlatoust Metal-Structure Plant for operation. The former PR-05-50/73 series was cumbersome and inconvenient for manufacture and for installing.

The new industrial constructional structure is more than twice as light as the old structure. The Zlatoust plant alone will now save 27,000-28,000 tons of rolled metal per year because of this. And if it is considered that productivity at the construction site will increase 1½-fold through the installation of this structure, then it becomes clear what a major step forward the factory workers have taken, jointly with scientists and designers.

Here in the vast well-lighted buildings there is none of the usual thunder of iron. Everything here is subordinated to the strict rhythm of the conveyor, and the machines control the operating process.

The plant's engineers had been searching for some years for more rational ways of making the product. Different variants were tried, but one that was economical enough was not found. So an appeal for help was made to TsNIIProyektstal'konstruktsiya [Central Scientific-Research and Design Institute for Metal Constructional Structure]. Laboratory chief V. Kolbatskiy was in charge of the work in this area in the institute.

The structure developed by the institute consisted of rectangular pipes 28x25 mm in size in the form of a figure-eight. They were joined by means of resistance welding. The design was simple to manufacture, but the scientists had to show no little inventiveness to assure that the new casements would be not only strong but lightweight and easy to install.

Introduction of the new technology enabled the production of casement glazing with a rubber seal, like the standard for bus windows. Thanks to this, heat losses in industrial buildings will be reduced.



Assimilating the new series has not gone smoothly by far. The conveyor and flow lines had to be adjusted while work was under way. But this was not the only complexity. There was a constant shortage of tubing of the required diameter at the plant. Foreign companies supplied them. Moreover, the tubing and the joining belts had to be welded manually from the start.

The rebuilding was nonstandard to a great extent. Builders of Zlatoustmetallurgstroy [Zlatoust Trust for the Construction of Metallurgical Facilities] and installers of the Startup and Setting-Up Administration of Vostokmetallurgmontazh [Trust for the Installation of Metallurgical Equipment in the Eastern Economic Region] were themselves often both the developers and the designers. Thus the new production facility became the joint offspring of South Urals builders, installers and factory workers. They obtained the first domestic output of this profile on the new equipment at the end of 1984.

At the start of this year, the enterprise converted completely to the output of the product made from its own section. During the rebuilding a rolling and pipe-welding mill, a unit for the longitudinal cutting of sheet, an unwinding machine and other machinery were installed in the casement-window department. Most of the facilities operate in an automated mode. Now the metalworkers themselves are rolling the rectangular tubes, and, with the help of high-frequency current welding machines, are making the necessary shapes. This year the plant should manufacture 15,000 tons of window casements of the new series. But the collective plans to do more. Reserves have been found already.

A group of specialists and scientists under V. Suvorov, candidate of engineering sciences and chief of the laboratory of the Urals NII [Scientific-Research Institute] for the Pipe Industry, has developed a technology for rolling finished section in the form of a figure eight all at once, omitting the intermediate operations for welding.

As you have noted, we have had to use the future tenses of verbs several times. The fact is that the new production facility has till now been forced to operate in the startup mode--the state commission still has not accepted it because of construction deficiencies at other facilities. They are waiting for the Zlatoustmetallurgstroy Trust builders to erect the mechanical-repair department, the warehouses for GSM's [fuels and lubricants] and petroleum product, the purification structures, and the fire department's reservoirs. In all, this year, another 800,000 rubles' worth of construction and installing operations are to be assimilated. The lack of haste is strange, for the contractors themselves are interested in obtaining new and effective window modules.

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CONSTRUCTION MACHINERY AND EQUIPMENT

LOW PLANT CAPACITY UTILIZATION IN CONSTRUCTION SECTOR NOTED

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 1, Jan 85 p 17

[Article: "Further Increasing the Proportion of Large-Panel Housing Construction"]

[Text] Gosgrazhdanstroy [State Committee for Nonindustrial Construction and Architecture], after examining the question of further increasing the proportion of large-panel housing construction by improving utilization of the capacity of enterprises that assemble fully prefabricated housing and by restricting the share of urban construction of brick apartment houses, noted that, in 1983, by using 79 percent of the productive capacity of enterprises that build fully prefabricated housing, the share of construction of fully prefabricated apartment houses in the total construction volume through state appropriations and ZhSK [housing-construction combine] resources was 54.4 percent. By using 85-90 percent of the enterprises' capacity, the share of construction of fully prefabricated apartment houses in the total volume of state and cooperative construction could be on the order of 58 percent.

The main causes of unsatisfactory use of the productive capacity of housing-construction enterprises was slow solution by ministries and agencies of some organizational and technical questions, including those of providing enterprises with supply and equipment resources, manning production activities and eliminating personnel turnover.

The large amount of obsolete and worn operating equipment, molds and rigging at operating enterprises affects negatively the quality of the output produced.

The low level of unification of the products list of reinforced-concrete products in some series of standard designs that were developed by Gosgrazhdanstroy and Union-republic gosstroy institutes complicates the enterprises' work and reduces utilization of their capacity. In so doing, output of the range of interlocking sectional units necessary for good-quality housing development has not been provided for. This, in turn, compels the use of brick housing.

The volume of contracting work in housing construction by ministries and departments, which is lower than the capacity of the enterprises for fully prefabricated housing construction that are subordinate to them, affects negatively utilization of the capacity in some regions. At the same time, solution of the problems of bringing the enterprises up to a full workload by the

output of reinforced-concrete structure for other ministries and departments that do not have large-panel housing-construction enterprises in these regions is attended by great difficulties. This question is complicated also by the impossibility of planning commodity output for enterprises that are on the construction roster.

Ministries and agencies are not satisfactorily realizing the programs for rebuilding and reequipping large-panel housing enterprises that were worked out for the 1983-1985 period. Certain Union-republic gosstroys, including RSFSR Gosstroy and the Kazakh SSR and Kirghiz SSR Gosstroys, have not taken adequate steps to reduce the amount of brick construction where there is underutilized large-panel housing-construction capacity.

It is recommended that ministries and agencies:

examine at board meetings the problems of utilizing the production capacity of enterprises that build fully prefabricated housing and of increasing the share of large-panel housing construction in the total amount of state and cooperative construction, as well as the problems of increasing the factory fabrication and raising the quality of the articles produced and of housing construction;

require that the plans for housing-construction combines call for erecting buildings for cultural and personal-services purposes with 1.090 constructional structure series, which is produced through the cooperation of housing-construction combine enterprises and ZhBI [reinforced-concrete products] plants; and

intensify monitoring over progress in realizing programs for the restructuring and operational reequipping of large-panel housing-construction enterprises and for developing such programs during the 12th Five-Year Plan.

It is recommended that Union-republic gosstroys intensify monitoring over the observance of the structure of housing construction and prohibit the construction of brick housing where the capacity of large-panel housing-construction enterprises is underutilized.

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CONSTRUCTION MACHINERY AND EQUIPMENT

BUILDING BRICK SHORTAGE IN LENINGRAD

Moscow STROITEL'NAYA GAZETA in Russian 27 Jan 85 p 2

VORONOV, V., Correspondent

[Abstract] The building brick shortage for Leningrad, estimated at 100 million, is expected to be offset by the soon-to-be completed automated enterprise at Nikol'skoye, a settlement near Leningrad. Annual output is expected to be 658,000 standard bricks per person (as against 250,000 industry average). The plant will employ only 152 people to provide an annual profit of 2.15 million rubles which is expected to return to the state its investment in less than eight years. Thirty percent of the entire production will be devoted to production of the facing brick now in short supply. However, current information shows that only one production association is producing the brick at barely 26-28 million pieces annually. Glavleningradstroy, meant to be the main customer, gets only 14 percent and Glavzapstroy gets 10 percent. The remaining 75 percent is distributed among minor consumers and is used mainly in building partitions and annexes. Losses due to poor handling qualities of the brick also result in lower output. Many problems were to have been solved in an experimental construction project in 1984 for a kindergarten, but this got no further than the excavation for the foundation. Output could be increased by mechanized assembly of pre-fabricated brick panels, but neither Glavlenstroy-material nor Glavleningradstroy are willing to take the initiative. It appears that Lensovet should act as arbitrator.

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CONSTRUCTION METHODS AND MATERIALS

INNOVATIONS IN CONCRETE PRODUCTION TECHNIQUES VIEWED

Moscow PRAVDA in Russian 20 Jan 85 p 2

[Article by N. Dolgoplov, doctor of technical sciences: "Powerful Additives - New Technology Activated"]

[Text] It would seem that nothing could be simpler than the production of concrete and reinforced concrete. Specific quantities of gravel, sand, cement and water are mixed, the obtained mix is delivered to forms, and it usually is compressed with vibrators. A waiting period ensues while the products reach a required solidity. If these are turned out at factories, hardening is speeded-up by heating and curing at 80 degrees in a steam heat atmosphere. Following this scheme we produce over 250 million cubic meters of concrete mixes per year, a good half of it at precast reinforced concrete plants.

In this manner production of concrete and reinforced concrete has reached phenomenal scales. It utilizes nearly all the cement produced in the country and many million tons of sand and gravel. About 20 million tons of steel per year are used for reinforcement and metallic forms, and about 12 million tons of coal for heat treatment of precast reinforced concrete. In construction, concrete and reinforced concrete consume about one half of overall expenditures.

The question arises: Does today's level of technical production using these materials correspond to the role designated for them? Technical and economic indicators testify to the facts. During the last three five-year plans, monetary returns have steadily declined. Work productivity is not very high--even at large-scale factories, there are less than two cubic meters of production per worker per day. The quality of productivity is also alarming. Highway reinforced concrete slabs in regions of Western Siberia begin to fall apart after one or two years, although their service life should be 20 years. Losses from low longevity of reinforced concrete products many times exceed their cost.

It is hardly necessary to have more obvious indicators than the existing "simple" technology has become obsolete and demands replacement. What kind specifically? First of all in our view, it is necessary to reject

the use of "hard" concrete mixes, "high-powered" methods of curing and lengthy heat treatment of products. To replace these, intensive concrete production methods should be based on new applications of chemistry.

Concrete production is, after all, essentially one of the divisions of chemical technology. Here are also chemical reactions between water and cement, physical-chemical processes, which determine the structure of concrete and its strength. By utilizing chemical methods it is possible to substantially accelerate production, increase volume, and raise labor productivity and product quality with a minimum expenditure of cement and energy. And this has already been proven not only by scientific research but by production practice, overseas as well as in our country. Naturally, mechanization, automation and "robotization" of production are also needed, but on the basis of new technological processes which require the introduction of surface-acting substances, the so-called superplasticizers.

Various "additives" to concrete mixes have been known for some time. Among them the waste products of cellulose-paper and vodka industries, as well as their various modifications. These are all useful, but they do not bring about new qualitative results as do the synthetic superplasticizers.

The point is that a lot of water is usually introduced in concrete mixes to make them plastic and insure ease of placement. During concrete hardening, water leaves pores and microcracks, greatly reducing its strength. Loss of strength is compensated by adding additional cement to the mix, which increases the product's net cost without always increasing the quality. Superplasticizers eliminate these deficiencies.

Two-thirds of interior walls for housing construction are made in vertical molds. To fill the relatively narrow space in the mold, a fluid concrete mix is prepared, consisting of 450 kilograms of cement and 220 liters of water per cubic meter. By reducing the water content by 50 liters and cement by 110 kilograms, the superplasticizers provide a "fluid" concrete mix, which when used in product forming requires three times less effort and eliminates the need for intense vibration.

In industrial construction, superplasticizers resolve essential questions in the production of high-strength concrete marks 600-800, made with ordinary cements mark 500. At the No. 11 factory of Glavmospromstroy-materialov (Glavnoye upravleniye promyshlennosti stroitel'nykh materialov; Main Administration of the Building Materials Industry) production of columns mark 500 has started using these cements. About 4 kilograms of superplasticizer for a concrete mass of 2,400 kilograms will insure product longevity and decrease to two-thirds times the cost of reinforcing steel.

Reinforced concrete blocks of tunnel lining obtained with the use of superplasticizers at the Ochakov Reinforced Concrete Components Factory of Mosmetrostroy (Upravleniye stroitel'stva Moskovskogo metropolitena; Moscow Metro Construction Administration) indicated a high degree of water proofness, in many instances eliminating the need of cast iron tubings. This will permit an economy of cost per linear meter of tunnel of 1000 rubles, and a saving of five tons of cast iron.

For the construction of first-category roads, everywhere we use asphalt. "Fluid" concrete mixes with superplasticizers insure a long-lasting, nonfreezing road cover, simultaneously decreasing labor from 34 to 7 working days for each 1,000 square meters with a saving of petroleum bitumen and reduction in construction cost.

Over two million cubic meters of reinforced concrete products and components have been produced at many plants and construction sites in recent years utilizing new native superplasticizers. This large-scale experiment has verified fully the possibility of speeding-up concrete work and achieving a simultaneous average saving of over 20 percent in cement, energy and labor resources. There is a substantial increase in the quality of reinforced concrete and its longevity.

In our country, three types of superplasticizers have been developed, tested and produced experimentally on an industrial scale. The Scientific Research Institute of Concrete and Reinforced Concrete of USSR Gosstroy has developed with the participation of chemists the superplasticizer "C-3", which is produced by enterprises of the USSR Ministry of Chemical Industry. As far back as 1977, the All-Union Scientific Research Institute of Reinforced Concrete of the USSR Ministry of Construction Materials had developed and tested at the factories a superplasticizer designated "10-03" and, then, together with scientists of the Azerbaijan Academy of Sciences, "40-03." Testing installations have been created at enterprises of construction industries. These native products correspond to and in some respects surpass the best world samples.

However, mass production of these products has not been established. Construction of a large installation for 60,000 tons of superplasticizer "C-3" has been delayed. An experimental industrial plant for 15,000 tons of superplasticizer "40-03" is underway. Raw materials are available and real possibilities to increase its production by 10-15 times, these possibilities must be exploited since the demand for these materials exceeds 300,000 tons per year.

True, certain ministries are also building a number of installations with the capacity of 4,000-6,000 tons. Providing the means of "chemicalization" regionally also has its positive aspects. With the establishment of small, mobile and simple installations, earmarked for 100,000-200,000 cubic meters of reinforced concrete per year, the construction industry enterprises and workers will have the possibility of engaging in a wider intensification of its production. Presently the

All-Union Scientific Research Institute of Reinforced Concrete is developing a "50-03" superplasticizer, distinguished by simplicity of preparation and availability of raw materials, which will more adequately than others suit the requirements of small installations.

The chemicalization of concrete has reached a period when serious care is required for its practical exploitation. It is believed that it would be advisable for USSR Gosstroy to consider the question of establishing territorial chemicalization centers at existing institutes and technological bureaus. It is desirable to establish leading enterprises and institutes for the task, determine the direction of their activities and range of responsibility. It would also be profitable to organize a systematic training of factory specialists and construction workers in the optimal use of the materials of chemicalization. This will permit a faster attainment of the immense technical and economic benefits that the new technology has to offer.

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CONSTRUCTION METHODS AND MATERIALS

POLYMER HELPS CEMENT

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[Abstract] A polymeric concrete additive called VRP-31 was developed at Tashkent Polytechnical Institute under the leadership of Academician K.S. Akhmedov. Initial tests at the Central Laboratory, Glavstroyindustria, UzSSR Ministry of Building and at the Fergana Home Building Combine showed that the additive improves the properties of finished prefab forms and monolithic concrete. The concrete mixture is more uniform, does not separate, and pours easily, while the finished products have high water and frost resistance. Adding VRP-31 to plugging mixtures and drilling muds improves their properties. The additive accelerates hardening of concrete in road construction. VRP-31 contains phenol and is simple to make. Cost per ton is 500 rubles as compared to 4200 for GKZh-94 and 1200 for VRP-1. A product costing only 60 ruble per ton does exist, but it must be used in 10 times greater amounts than VRP-31 to get the same effect. The polymer's capability to hasten the hydration process results in a 5-7 percent saving in cement. This will save the republic 6,779,000 rubles annually.

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